RESEARCHING THE WORLD'S BEADS: AN ANNOTATED BIBLIOGRAPHY

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Society of Bead Researchers

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ARCHAEOMETRIC ANALYSIS

This portion of the bibliography deals specifically with the determination of the chemical properties and composition of beads of all materials from around the world, as well as their dating and sourcing.

Abel, Timothy J., James W. Bradley, and Lisa Anderson

2019 Rediscovery and Analysis of Copper Beads from Two Iroquoian Sites in Jefferson County, New York. *The Bulletin: Journal of the New York State Archaeological Association*; https://www.academia.edu/38042171/.

XRF analysis of four copper beads – some of which were believed to be European – revealed that they are all made of native copper, confirming that there is no verifiable evidence of European trade goods among the precontact Iroquoian people of northern New York.

Abel, Timothy J. and Adrian L. Burke

2014 The Protohistoric Time Period in Northwest Ohio: Perspectives from the XRF Analysis of Metallic Trade Materials. *Midcontinental Journal of Archaeology* 39(2):179-199.

Concludes that, while not precise enough to source native coppers, XRF is a cheap, nondestructive method for differentiating native copper from its European counterparts at 16th- and 17th-century Late Woodland sites. The analyzed material included beads and pendants.

Acevedo, Natalia, Marion Weber, Antonio García-Casco, Joaquín Antonio Proenza, Juanita Sáenz, and Agustín Cardona

2016 A First Report of Variscite Tairona Artifacts (A.D. 1100-1600) from the Sierra Nevada de Santa Marta, Colombia, and its Implications for Precolumbian Exchange Networks in the Region. *Latin American Antiquity* 27(4):549-560; https://www.academia.edu/75749072/.

Archaeometric analyses (Raman Spectroscopy Analysis, X-Ray Diffraction, and Electron Microprobe Analysis) of greenstone beads have revealed that they are made of variscite-group minerals.

Adrimi-Sismani, Vassiliki, Maria Filomena Guerra, and Philippe Walter

2009 La tombe mycénienne de Kazanaki (Volos) et le mythe de la Toison d'or / The Mycenaean Tomb of Kazanaki (Volos) and the Myth of the Golden Fleece. *ArcheoSciences* 33:135-141; https://www.academia.edu/40109979/.

Reports on the compositional analysis and production techniques of gold necklace beads found at a Mycenaean tholos tomb at Volos, Greece, and dated to 1350 BC.

Agha-Aligol, Davoud, Moslem Jafarizadeh, Mehdi Rahbar, and Mahmoud Moradi

2019 Elemental Composition of Glass Beads Excavated from Saleh Davoud Tombs in Susa by Micro-PIXE: Evidences of Trade of Glass Artifacts during the Parthian Period. *Journal of Research on Archaeometry* 5(1):143-166; https://www.researchgate.net/publication/337693144.

Reports on the composition of bead and glass vessel fragments from a site in Iran. In Arabic with English summary.

Agua, F., J.F. Conde, U. Kobylińska, Z. Kobyliński, M. García-Heras, and M.A. Villegas

2017 Chemical-Physical Characterisation of Early Iron Age Glass Beads from Central Europe. *Boletín de la Sociedad Española de Cerámica y Vidrio* 56(3).

The main objective was to attain information on the production technology and conservation state of mostly decorated beads from sites (6th-4th centuries BC) in west Poland and south Germany.

Aguilar-Melo, Valentina, Alejandro Mitrani, Edgar Casanova-Gonzalez, Mayra D. Manrique-Ortega, Griselda Pérez-Ireta, José Luis Ruvalcaba-Sil, Alejandro Tovalin-Ahumada, Julia Leticia Moscoso-Rincón, Alejandro Seshenña-Hernández, and Josuhé Lozada-Toledo

2019 Molecular and X-ray Spectroscopies for Noninvasive Characterization of Mayan Green Stones from Bonampak, Chiapas. *Applied Spectroscopy*; https://www.academia.edu/40386033/.

Several spectroscopic techniques were used in a complementary way to characterize a number of greenstone beads found with a burial of the classical period (4th-9th centuries AD) located in the southern state of Chiapas, Mexico.

Aldenderfer, Mark and Laure Dussubieux

2022 Sources of Glass Beads from the High Himalayas: 1200 BCE-CE 650. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 197-220. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.15.

The compositional analysis of glass beads from three sites in north-central Nepal that span the period from 450 BCE to 880 CE provides insights into the directionality and intensity of trade relationships in the high Himalayan valleys.

Allen, Lindy, Sarah Babister, Elizabeth Bonshek, and Rosemary Goodall

2018 Finding the Signatures of Glass Beads: A Preliminary Investigation of Indigenous Artefacts from Australia and Papua New Guinea. *Journal of the Anthropological Society of South Australia* 42:48-80.

Presents the results of chemical analysis of a sample of beads on objects from the collections at Museums Victoria in Melbourne, as well as a comparative set of beads on objects from neighboring Papua New Guinea. Done to gain a broader understanding of possible pathways along which beads and beaded objects made their way into the Pacific during the colonial and pre-colonial eras, and to consider the possibility of common origins with those found in Aboriginal objects.

Amrein, Heidi and Sophie Wolf

2011 Les perles en verre de l'âge du fer provenant de la nécropole de Giubiasco: Apport des analyses et réflexions sur l'artisanat du verre. *Bulletin de l'Association Française pour l'Archéologie du Verre, 2011*:43-45.

Reports on the chemical composition of Iron Age glass beads from the Giubiasco necropolis in Switzerland.

Anderson, K.B. and W. Bray

2006 The Amber of *El Dorado*: Class Ib Archaeological Ambers Associated with *Laguna Guatavita*. *Archaeometry* 48(4):633-640; https://www.academia.edu/28314337/.

Geochemical analysis of pre-Columbian beads collected from a lake in central Colombia establishes that they are fabricated from Class Ib amber, possibly from a unique local or regional source.

Angelini, Ivana

2008 Archaeometry of Bronze Age and Early Iron Age Italian Vitreous Materials: A Review. In *Proceedings of the 37th International Symposium on Archaeometry, 13th-16th May 2008, Siena, Italy*, edited by Isabella Turbanti-Memmi, pp. 17-23. Springer.

On the evolution of faience to glass in Italy during the Bronze Age. The study is based mainly on the analysis of ornamental beads of faience and glass.

Angelini, I., G. Artioli, P. Bellintani, Valeria Diella, Mauro Gemmi, A. Polla, and Antonella Rossi

2004 Chemical Analyses of Bronze Age Glasses from Frattesina di Rovigo, Northern Italy. *Journal of Archaeological Science* 31:1175-1184; https://www.academia.edu/990976/.

Reports on the chemical composition of glass scrap and beads recovered from Frattesina. They represent the only evidence of Final Bronze Age (1200-1000 BC) glass working processes in Europe.

Angelini, I., G. Artioli, P. Belliantani, V. Diella, A. Polla, G. Recchia, and G. Residori

2003 Materiali vetrosi da Grotta Manaccora e Coppa Nevigata: inquadramento archeologico e archeometrico nell'ambito della civiltà del Bronzo italiana. In *Il vetro in Italia meridionale e insulare, Secondo Convegno Multidisciplinare*, edited by C. Piccioli and F. Sogliani, pp. 127-138. Tipografia Zaccaria, Naples. https://www.academia.edu/31903573/.

A typological and archaeometric study of the glass and faience beads recovered from two sites in southern Italy within the context of the Italian Bronze Age civilization. Much comparative material.

Angelini, I., G. Artioli, P. Bellintani, and A. Polla

2005 Protohistoric Vitreous Materials of Italy: From Early Faience to Final Bronze Age Glasses. *Annales du 16^{e} Congrès de l'Association Internationale pour l'Histoire du Verre*, pp. 32-36.

On the evolution of faience to glass during the Bronze Age. Many of the samples were beads.

Angelini, Ivana and Paolo Bellintani

2005 Archaeological Ambers from Northern Italy: An FTIR-DRIFT Study of Provenance by Comparison with the Geological Amber Database. *Archaeometry* 47(2):441-454; https://www.academia.edu/991620/.

Analysis of amber beads from sites dating from the Middle Bronze Age to the Iron Age in northern and southern Italy reveals that all but five of the 35 specimens are composed of Baltic succinite amber.

2006 Archeometria della ambre protostoriche: dati acquisiti e problemi aperti. *Atti della XXXIX Riunione Scientifica, Firenze 2004* III:1477-1493.

Reports on the infrared spectroscopic investigation of 57 bead samples from 16 Italian sites, DRIFT technique. Most samples were Baltic but a small amount of non-Baltic amber was used in both the Bronze and Iron ages, probably from as yet unidentified local deposits. A unique case is Poggiomarino (Naples area), where 7 of the 12 samples were not Baltic (p. 1489). Summaries in French and English.

Angelini, Ivana, Cinzia Bettineschi, and Bernard Gratuze

2020 Vaghi e bracciali in vetro: studio archeologico-archeometrico. In *Le Ceneri degli Statielli La Necropoli della Seconda età del Ferro di Montabone*, edited by Marica Venturino, pp. 171-194. De Ferrari, Genoa.

Analysis of 56 glass ornaments (beads included) from the necropolis of Montabone (late 3rd-late 2nd century BC) in northern Italy revealed they comprise glasses of Celtic typologies.

Angelini, Ivana, Bernard Gratuze, and Gilberto Artioli

2019 Glass and Other Vitreous Materials through History. *EMU Notes in Mineralogy* 20(Chapter 3):87-150; https://www.academia.edu/68841446/.

The nature and properties of vitreous materials are summarized briefly, with an eye to the historical evolution of glass production in the Mediterranean world. Focus is on the evolution of European, Egyptian, and Near East materials. The most common techniques of mineralogical and chemical characterization of vitreous materials are also described.

Angelini, I., C. Nicola, G. Artioli, R. DeMarinis, M. Rapi, and M. Uboldi

2008 Chemical, Mineralogical and Textural Characterisation of Early Iron Age Vitreous Materials from the Golasecca Culture (Northern Italy). In *Proceedings of the 37th International Symposium on Archaeometry, 13th-16th May 2008, Siena, Italy*, edited by Isabella Turbanti-Memmi, pp. 25-32. Springer.

Aims at defining the chemical chronology for vitreous materials during the transition from the Bronze Age to the Iron Age in northern Italy. Beads constituted the samples tested.

Angelini, I., A. Polla, and G. Artioli

2007 Archaeometric Investigation of Ornamental Faience Beads from Lavagnone (BS). *Notizie Archeologiche Bergomensi* 10:285-299.

Chemical analysis of beads from the Bronze Age pile dwellings of Lavagnone in northern Italy.

Angelini, I., A. Polla, B. Giussani, P. Bellintani, and G. Artioli

2009 Final Bronze-Age Glass in Northern and Central Italy: Is Frattesina the Only Glass Production Centre? In *Proceedings 36th International Symposium on Archaeometry, 2-6 may 2006, Quebec City, Canada*, edited by Jean-François Moreau, Réginald Auger Jacques Chabot, and Anja Herzog, pp. 329-337. Cahiers d'archéologie du CELAT 25, Série archéométrie 7. https://www.academia.edu/991170/.

Analysis of glass ingot fragments, beads, and other ornamental objects found at Frattesina reveals the glass invariably belongs to the low-magnesium, high-potassium (LMHK) mixed-alkali glass group that is generally considered typical of protohistoric European glass production.

Anikeeva, O.V. , R.R. Ruslanova (Tamimdarova), and R.Kh. Khramchenkova

2013 Украшения из стекла и камней городища Уфа-II [Jewelry of Glass and Stones of the Fortress Ufa-II]. In *The Urals and the Vastness of Eurasia through Centuries and Millennia: Scientific Publications Dedicated to the 80th Anniversary of N.A. Mazhitova*, edited by A.N. Sultanova, pp. 86-108. Bashkir State University, Ufa. https://www.academia.edu/11282506/.

Describes a wide variety of stone, amber, glass, and coral beads. The chemical composition of some of the glass beads is provided.

Apolinarska, Karina and Aldona Kurzawska

2020 Can Stable Isotopes of Carbon and Oxygen be Used to Determine the Origin of Freshwater Shells Used in Neolithic Ornaments from Central Europe? *Archaeological and Anthropological Sciences* 12:15; https://www.academia.edu/41606325/.

This study aims to determine the origin of disc shell beads excavated in Poland by analyzing, for the first time, their carbon and oxygen stable isotope compositions and comparing the results with C and O isotope ratios in modern shells sampled in central Poland.

Arai, Saki, Shinsuke Baba, Izumi Nakai, Kazuyuki Nakamura, and Naoya Tsukad

2018 Chemical Composition Analysis of Glass Beads Excavated from Sites in Southern Part of Hokkaido at Ainu Cultural Period. *Research Reports of National Institute of Technology, Hakodate College* 52:20-38; https://doi.org/10.20706/hakodatekosen.52.0_20.

Dating to the 15th-19th centuries, the beads can be classified into two types: lead-potash-silicate glass (K2O-PbO-SiO2) and potash-lime-silicate glass (K2O-CaO-SiO2). Japan. In Japanese.

Arletti, Rossella, Erica Bertoni, Giovanna Vezzalini, and Davide Mengoli

2011 Glass Beads from Villanovian Excavations in Bologna (Italy): An Archaeometrical Investigation. *European Journal of Mineralogy* 23(6):959-968.

Fifteen blue, turquoise, and dark green glass beads of the 8th-7th centuries BC were analyzed. Chemical analyses of major and minor elements were obtained by EMPA, whereas trace elements were determined on selected samples by LA-ICP-MS.

Arletti, Rossella, Daniela Ferrari, and Giovanna Vezzalini

2012 Roman Glass from Mozia (Sicily-Italy): The First Archaeometrical Data. *Journal of Archaeological Science* 39(11):3396-3401.

Presents the results of an archaeometrical investigation performed on a series of opaque pre-Roman glass objects including beads, pendants, and a spindle-whorl dating from the 6th-4th centuries BC. All were found to be silica-soda-lime glass produced with natron. Opaque decorations were made by using Sb-based opacifiers.

Arletti, Rossella, C. Maiorano, D. Ferrari, G. Vezzalini, and S. Quartieri

2010 The First Archaeometric Data on Polychrome Iron Age Glass from Sites Located in Northern Italy. *Journal of Archaeological Science* 37(4):703-712.

Samples of highly decorated beads, spindle whorls, and vessels of the “Mediterranean Group I” from Etruscan contexts (Bologna and Spina [FE] necropoleis) dating between the 6th and 4th centuries BC were analyzed to determine whether these different artifacts were produced at the same manufacturing site. While the vessels almost certainly originate from Greece, the beads could derive from a more ancient local production ascertained at the site of Frattesina (Rovigo, Italy) and dated to the Bronze Age.

Ashkenazi, D., H. Gitler, A. Stern, and O. Tal

2017 *Metallurgical Investigation on Fourth Century BCE Silver Jewellery of Two Hoards from Samaria.* Scientific Reports 7, 40659; https://www.academia.edu/30990531/.

This report gives us a better understanding of technological abilities in the province of Samaria during the late Persian period as regards the production of beads and other ornaments. Includes compositional data. Israel.

Ašperger, Danijela, Sena Jorgić, Anita Rapan Papeša, Stjepko Fazinić, and Marija Trkmić

2018 Destructive and Non-Destructive Methods in the Analysis of Glass Jewellery from the Archaeological Site Nuštar. In *The Historical Glass: A Multidisciplinary Approach to Historical Glass III,* edited by Danica Staššíková-Štukovská, pp. 119-123. Slovak Archaeological Society at SAV, Bratislava**.** https://www.academia.edu/38267813/.

Reports the results of two different methods used for analyzing selected glass beads from an Avar-period cemetery at the Nuštar Dvorac site in Croatia.

Astrup, E.E. and Arnfinn G. Andersen

1987 A Study of Metal Foiled Glass Beads from the Viking Period. *Acta Archaeologia* 58:222-228.

On the structure and composition of beads from Kaupang and Birka, Sweden, examined by Scanning Electron Microscope and chemical analysis (ICP).

Atasayar, Z., Ö.O. Öztürk, M. Bakiler, and O. Destanoğlu

2021 The Provenance of Iron Age Glass Beads: A Chemical and Isotopic Approach. Paper presented at the 3rd International Congress on Analytical and Bioanalytical Chemistry, 22-26 March, Elazığ, Turkey.

Aims to identify the recipe used to make glass beads recovered from the Mound of Van Fortress in Urartu, eastern Turkey, using ICP-MS technology.

Aurisicchio, Carlo, Alessia Corami, Sylvana Ehrman, Giorgio Graziani, and Stella Nunziante Cesaro

2006 The Emerald and Gold Necklace from Oplontis, Vesuvian Area, Naples, Italy. *Journal of Archaeological Science* 33(5):725-734; https://www.academia.edu/15865815/.

EPMA and microFTIR analysis of the emerald beads, dating from the 1st century AD, suggests they are of Egyptian origin.

Azemar R., Y. Billaud, G. Costantini, and B. Gratuze

2000 Les perles protohistoriques en verre de l'Aveyron. *Cahiers d'Archéologie Aveyronnaise* 14:75-88.

On the chemical analysis of protohistoric glass beads found at Aveyron in southern France.

Baba, Shinsuke, Kazuya Yanase, Aiko Imai, Izumi Nakai, Yasukazu Ogawa, Kenichiro Koshida, and Kazuyuki Nakamura

2017 Chemical Compositional Analysis of Ainu-Glass Beads Excavated from Hokkaido. *Research Reports of National Institute of Technology, Hakodate College* 51:48-67.

Belonging to the period from the mid 14th to the 19th century AD, the beads are of two types: lead-potash silicate glass and potash-lime silica glass. In Japanese with English abstract. Japan.

Babalola, Abidemi Babatunde

2017 Ancient History of Technology in West Africa: The Indigenous Glass/Glass Bead Industry and the Society in Early Ile-Ife, Southwest Nigeria. *Journal of Black Studies*; https://www.academia.edu/35776288/.

Drawing from archaeological and historical evidence from Ile-Ife, in tandem with the result of compositional analysis, this article examines the first recognized indigenous Sub-Saharan African glass technology dated to early 2nd millennium AD or earlier.

Babalola, Abidemi Babatunde, Laure Dussubieux, Susan Keech McIntosh, and Thilo Rehren

2018 Chemical Analysis of Glass Beads from Igbo Olokun, Ile-Ife (SW Nigeria): New Light on Raw Materials, Production, and Interregional Interactions. *Journal of Archaeological Science*; https://www.researchgate.net/publication/322542368.

Analysis of 52 beads has revealed that none matched the chemical composition of any other known glass-production area in the Old World, including Egypt, the eastern Mediterranean, the Middle East, and Asia. Rather, the beads have a high-lime, high-alumina (HLHA) composition that reflects local geology and raw materials.

Babalola, Abidemi Babatunde, Susan Keech McIntosh, Laure Dussubieux, and Thilo Rehren

2017 Ile-Ife and Igbo Olokun in the History of Glass in West Africa. *Antiquity* 91(357):732-750.

The recovery of glass beads and associated production materials from a site in Nigeria has enabled compositional analysis of the artifacts and preliminary dating of the site, which puts the main timing of glassworking between the 11th and 15th centuries AD.

Babalola, Abidemi and Thilo Rehren

2016 The11th-15th Century AD Glass Crucibles from Ile-Ife, Southwest Nigeria. Paper presented at the 23rd biannual Society of Africanist Archaeologists conference, Toulouse, France. https://www.researchgate.net/publication/306017012

Presents the results of the classification, macro/microstructural, and compositional analyses carried out on glass-working and possibly glassmaking crucibles excavated at Igbo Olokun, Ile-Ife. Drawn-bead production waste was also recovered.

2023 Some Thoughts on Glass in African Archaeology: An Introduction. *African Archaeological Review* 40; https://doi.org/10.1007/s10437-023-09528-7.

Introduces and outlines the five articles on research (including elemental analysis) on glass beads in Sub-Saharan Africa which appear with this article.

Babalola, Abidemi Babatunde, Thilo Rehren, Akinlolu Ige, and Susan McIntosh

2018 The Glass Making Crucibles from Ile-Ife, SW Nigeria. *Journal of African Archaeology* 16:1-29.

Provides an in-depth examination of numerous crucible fragments recovered from 11th to 15th-century deposits in order to understand the quality of the crucibles, their typology, and their functions in glassworking/making. Compositional analysis of a sample of the thousands of excavated glass beads indicates that the crucibles were used to melt the glass used for their production.

Bagdzevičienė, J., C. Niaura, E. Garškaitė, J. Senvaitienė, J. Lukšėnienė, and S. Tautkus

2011 Spectroscopic Analysis of Lead Tin Yellow Pigment in Medieval Necklace Beads from Kernavė-Kriveikiškės Cemetery in Lithuania. *Chemija* 22:2016-222.

Various analytical methods were used to identify the chemical composition and characterize the pigments of glass beads dating back to the 13th-14th centuries.

Bagherpour Kashani, Natascha

2022 *Depositional Practices at the Natural Sanctuary of Veshnaveh, Central Iran. Jewellery and Watery Caves.* Verlag Marie Leidorf, Bochum. https://www.academia.edu/74606881/.

A special rural sanctuary of pre- and early Zoroastrian cults yielded a variety of glass, stone, amber, and metal beads and pendants. Their typology, production techniques, and chemical composition are discussed.

Bagherpour Kashani, N., K. Roustaei, and T. Stöllner

2011 Iron Age Amber Beads from Vešnave/Iran. *Archäologische Mitteilungen aus Iran und Turan* 43:71-78.

Various bead forms were recovered. Infrared spectroscopy revealed that the beads originated in the Baltic region.

Bajnóczi, Bernadett, Krisztián Fintor, Máté Szabó, and Mária Tóth

2018 Preliminary Micro-XRF Study of Mosaic Face Beads Found in an Early Sarmatian Grave Excavated at Dunakeszi – Implications for the Base Glass Composition and Colourants. In *"Hadak útján." 26th Conference of Young Scholars on the Migration Period, Budapest, 2016. november 3-4,* edited by Zsófia Rácz, István Koncz, and Bence Gulyás, pp. 33-44. Dissertationes Archaeologicae, Supplementum 2. http://dissarch.elte.hu/index.php/dissarch/article/view/338/311.

Analysis revealed that the glass beads were produced, at least partially, using a plant-ash alkali flux.

Bajnóczi, Bernadett, Gabriella Schöll-Barna, Nándor Kalicz, Zsuzsanna Siklósi, George H. Hourmouziadis, Fotis Ifantidis, Aikaterini Kyparissi-Apostolika, Maria Pappa, Rena Veropoulidou, and Christina Ziota

2013 Tracing the Source of Late Neolithic *Spondylus* Shell Ornaments by Stable Isotope Geochemistry and Cathodoluminescence Microscopy. *Journal of Archaeological Science* 40(2):874-882; https://www.academia.edu/2031773/.

Stable isotope analysis combined with cathodoluminescence microscopy was performed on ornaments (beads, bracelets) made of *Spondylus* shells excavated at the Aszód-Papi Földek site in Hungary to define their origin.

Bandama, Foreman

2013 The Archaeology and Technology of Metal Production in the Late Iron Age of the Southern Waterberg, Limpopo Province, South Africa. Ph.D. thesis. Department of Archaeology, University of Cape Town.

Despite the title, this thesis also deals with the beads of glass, mollusc shell, ostrich eggshell, and bone recovered from two sites: Rhenosterkloof 1 and Tembi 1. The glass specimens are attributed to the Khami Series (14th-17th centuries). Compositional analysis is included.

Bandama, Foreman, Shadreck Chirikure, Simon Hall, and Christel Tinguely

2018 Measly but Motley and Manifest: The Typological and Chemical Characterisations of Glass Beads from the Southern Waterberg, Limpopo Province of South Africa. *Journal of Archaeological Science: Reports* 18:90-99; https://doi.org/10.1016/j.jasrep.2017.12.047.

Reports on 25 glass beads dating to the 15th-19th centuries recovered from two sites: Smelterskop and Rhenosterkloof 1.

Bărbat, Ioan Alexandru, Tudor Tămaş, and Simona Cîntă Pînzaru

2021 Greenstone Beads in the Early Neolithic of Transylvania? An Interdisciplinary Approach to Study a Small Prehistoric Adornment Discovered in Lunca Târnavei, Romania. *Banatica* 31:15-47; https://www.academia.edu/70834103/.

Analysis of a greenish stone bead using X-ray diffraction and Raman spectrometry revealed the object is carved from a metamorphic rock, probably a green schist or chlorite schist.

Barfod, Gry H., Claus Feveile, and Søren M. Sindbæk

2022 Splinters to Splendours: From Upcycled Glass to Viking Beads at Ribe, Denmark. *Archaeological and Anthropological Sciences* 14, 180; https://doi.org/10.1007/s12520-022-01646-8.

Reports on the LA-ICP-MS analysis of glass recovered from two bead-making workshops in the 8th-century trading emporium of Ribe.

Baron, Anne, Adrian L. Burke, Bernard Gratuze, and Claude Chapdelaine

2016 Characterization and Origin of Steatite Beads Made by Northern Iroquoians in the St. Lawrence Valley During the 15th and 16th Centuries. *Journal of Archaeological Science: Reports* 8:323-334; https://www.academia.edu/35613409/.

LA-ICP-MS analysis revealed the use of steatite from only carbonate rocks and not steatite hosted in ultramafic rocks, which is different from most previous studies. Moreover, relationships between a limited number of sources and some archaeological artifacts have been identified.

Barroso Bermejo, Rosa, Carlos P. Odriozola, Primitiva Bueno Ramírez, Rodrigo Villalobos García, Rodrigo Balbín Behrmann, and José María Martínez Blanes

2021 Mineral Adornments at Chalcolithic Sites in Inland Iberia: Variscite Beads at Valle de las Higueras (Huecas, Toledo) Spain. *Mediterranean Archaeology and Archaeometry* 21(3):177-203; https://www.academia.edu/73009092/.

This study reports on the morphology and mineral composition of a quadrangular pendant and 341 stone beads, most of which are made of variscite, a mineral that became especially important for adornments on the Iberian Peninsula in the 3rd millennium BC.

Bar-Yosef Mayer, Daniella E. and Naomi Porat

2013 Beads. In *Peqi'in: A Late Chalcolithic Burial Site, Upper Galilee, Israel,* edited by Dina Shalem, Zvi Gal, and Howard Smithline, pp. 337-364. Kinneret Academic College, Institute for Galilean Archaeology, Israel.

Describes the typology of the stone and shell beads and assesses their possible sources. Includes archaeometric analysis.

Basa, K.K, I.C. Glover, and J. Henderson

1991 The Relationship between Early Southeast Asian and Indian Glass. *Bulletin of the Indo-Pacific Prehistory Association* 10:366-385.

Includes new analytical results comparing early Indian glass beads and those from Ban Don Ta Phet, Thailand, and Sembiran, Bali, Indonesia.

Basilia, Pauline A.

2013 Application of Scanning Electron Microscopy (SEM) and Energy-Dispersive X-ray Spectroscopy (EDS or EDX) on Archaeological Residue from Microperforated Cut Shell Beads. Paper presented at the International Conference on Southeast Asian Archaeology, Burapha University, Saen Suk, Thailand.

This project analyzes microperforated cut shell beads to reconstruct the manufacturing process based only on the final form of the artifact and surviving traces from the production process. The shell beads are from the Intensive Burial Phase (ca. 2000-200 BP) at the Ille Site, Northern Palawan, Philippines.

2014 Examining Residue Morphology of the Microperforated Cut Shell Beads from Ille Site, el Nido Palawan. In *Proceedings of the Philippine Association of Microscopists, Inc. (MICROSPHIL) Annual Scientific Conference and General Assembly, Taguig City*, Vol 7, Ch 1, pp. 40-43; https://www.academia.edu/7887738/.

Four Metal Age shell beads exhibiting unique residues (black, yellow, red, and high-fiber) were examined using Scanning Electron Microscopy (SEM), revealing that the appliqués included plant fibers and were applied as a viscous material and allowed to dry.

Bassett, Madeleine Gunter, Christopher M. Stevenson, and Laure Dussubieux

2019 Re-Examining Trade Networks in Late Woodland Virginia (900-1600 CE): An LA-ICP-MS Analysis of Copper Artifacts. *Journal of Archaeological Science: Reports* 27; https://www.academia.edu/40744627/.

The data suggest that much of the native copper that circulated through interior trade networks came from more-distant deposits (e.g., Michigan), rather than from sources in the Blue Ridge Mountains of Virginia.

Bayley, Justine

2000 XRF Analysis of the Beads. In *Dunadd: An Early Dalriadic Capital*, by A. Lane and E. Campbell, pp. 217-218. Oxbow Books, Oxford.

Glass beads; Scotland.

Becerra, María Florencia, Beatriz N. Ventura, Patricia Solá, Mariana Rosenbusch, Guillermo Cozzi, and Andrea Romano

2021 Arqueomineralogía de cuentas de los valles orientales del norte de Salta, Argentina. *Boletín del Museo Chileno de Arte Precolombino* 26(1):93-112; https://www.academia.edu/49999662/.

On the archaeomineralogy of beads from the Eastern Valleys of Northern Salta, Argentina. Beads made of turquoise, sodalite, opal tuff, slate, glass, and shell. Includes the archaeometric analysis of 27 stone beads using SEMK-EDX and XRD.

Beck, Curt W.

1996 Spectroscopic Identification of "Amber" and "Black Resin" from Asine. In *Asine III: Supplementary Studies on the Swedish Excavations 1923-1930,* edited by R. Hagg, G.C. Nordquist and B. Wells, pp. 91-92. Acta Instituti Atheniensis Regni Sueciae 4°, XLV fasc. 1.

Mycenaean beads described as "black resin" proved on analysis to be Baltic amber, probably exposed to fire. Greece.

Beck, Curt W. and Y. Lily

1995 Analysis and Provenience of Minoan and Mycenaean Amber, V: Pylos and Messenia. *Greek, Roman and Byzantine Studies* 36(2):119-135.

The beads are nearly all Baltic amber but a few are probably Sicilian simetite.

Beck, Curt W. and S. Shennan

1991 *Amber in Prehistoric Britain.* Oxbow Monograph 8.

Definitive and indispensable study with a catalog of the beads (with many drawings and sections), spectrographic analysis results, and a discussion of manufacturing techniques, social significance, and chronology.

Beck, Curt W., Raquel Vilaça, and E.C. Stout

2002 Provenience Analysis of Prehistoric Amber Artifacts in Portugal. *Madrider Mitteilungen* 43:61-78.

Behar, Adi Eliyahu, Shira Albaz, Itzhaq Shai, Aren M. Maeir, and Haskel J. Greenfield

2016 Faience Beads from Early Bronze Age Contexts at Tell es-Safi/Gath, Israel. *Journal of Archaeological Science: Reports* 7:609-613; https://www.academia.edu/80432963/.

The beads were subjected to analysis by FTIR spectrometry in order to identify the mineralogy and materials used for their production. The materials identified include faience, carnelian, steatite, and shell.

Bellintani, Paolo

2015 Bronze Age Vitreous Materials in Italy. *Annales du 19e Congrès de l'Association Internationale pour l'Histoire du Verre, Piran 2012,* pp. 15-21.

On the chemical composition of glass and faience beads dating to the 21st-9th centuries BC. Also discusses Bronze Age "glass routes" in the central Mediterranean.

Bellintani, Paolo, Ivana Angelini, Gilberto Artioli, and Angela Polla

2007 Villaggio delle Macine: le più antiche perle in vetro e ambra dell'Italia centrale. In *Strategie di insediamento fra Lazio e Campania in età preistorica e protostorica, Atti della XL Riunione Scientifica dell'Istituto Italiano di Preistoria e Protostoria, 30 Novembre - 3 Dicembre 2005, Roma, Napoli, Pompei,* pp. 891-895.

Presents the archaeometrical characterization of an amber bead (Baltic succinite) and a glass bead (high-magnesium glass) found in layers dated to the beginning of the Middle Bronze Age at a site at Lago di Albano, Rome, Italy.

Beltsios, Konstantinos G., Artemios Oikonomou, Nikolaos Zacharias, and Pavlos Triantafyllidis

2012 Characterization and Provenance of Archaeological Glass Artifacts from Mainland and Aegean Greece. In *Obsidian and Ancient Manufactured Glasses*, edited by Ioannis Liritzis and Christopher M. Stevenson, pp. 166-184. University of New Mexico Press, Albuquerque. https://www.academia.edu/10842984/.

SEM-EDS analysis was used for the compositional characterization of two ancient glass bead collections, a late 7th-century BC Archaic collection from Rhodes Island and an Archaic to Hellenistic collection from mainland Greece (Thebes).

Bente, Klaus, Christoph Berthold, Melanie Keuper, Axel Gerdes, Jörg Ansorge, and Andreas König

2017 Die Korallenperlenkette aus Greifswald von um 1300 – archäometrische Untersuchungen an *Corallium rubrum* aus einer mittelalterlichen Hansestadt. *Archäologische Berichteaus Mecklenburg-Vorpommern* 24:69-79; https://www.academia.edu/34924930/.

Analysis of a coral necklace from a medieval Hanseatic town in Germany revealed it was genuine red coral from the Mediterranean Sea, and corresponding trade routes towards central Europe can therefore be suggested. *See also* Ansorge and Kaute (1999) in the Europe section.

Bente, Klaus, Marco Schrickel, Jörg Frase, and Alexandra Franz

2012 3D-tomographische und Röntgenbeugungsstudienan latènezeitlichen Fibeln mit Perlenbesatz. In *Technologieentwicklung und –transferin der Hallstatt- und Latènezeit. Beiträge zur Internationalen Tagung der AG Eisenzeit und des Naturhistorischen Museums Wien, Prähistorische Abteilung - Hallstatt 2009*, edited by Anton Kern et al., pp. 189-192. Beiträge zur Ur- und Frühgeschichte Mitteleuropas 65. https://www.academia.edu/2593839/.

Analysis of a bead-decorated fibula (called *Mitteldeutsche Korallenfibeln* and dating to the Early Iron Age) excavated near Hänichen in east-central Germany, reveals that the beads may be fossil material and not necessarily coral.

Bentz, Marc, Frank Falkenstein, Christoph Herbig, Ulrich Himmelmann, Christof Kneisel, Stephanie Mildner, and Nils Ostermeier

2018 Der Hohenberg zwischen Annweiler und Birkweiler in der Sudpfalz. Ausgrabungen und Prospektionen in einer befestigten Höhensiedlung der Urnenfelderzeit 2016 und 2017. *Mitteilungen des Historischen Vereins der Pfalz* 115:11-81; https://www.academia.edu/38218652/.

Section 5 reports on the chemical composition of the glass beads recovered from a hilltop settlement of the Urnfield culture in southwestern Germany.

Berón, Mónica Alejandra

2012 Cuentas de collar verdes: materias primas, contextos y significación en un cementerio de cazadores-recolectores de La Pampa (Argentina). In *El jade y otras piedras verdes: Perspectivas interdisciplinarias e interculturares,* edited by Walburga Wiesheu and Gabriela Guzzy, pp. 197-226. Instituto Nacional de Antropología e Historia, Mexico DF; https://www.academia.edu/3626194/.

Investigates the raw materials, contexts, and significance of green necklace beads recovered from a hunter-gatherer cemetery in central Argentina.

Bertini, Martina

2012 Beads of Time: Analyzing Our Past. *Chemistry Review* 21(3):19-23.

A collection of beautiful glass beads discovered in Scotland was analyzed. The results point “to an ancient form of glass recycling between the Romans and the Iron Age Caledonians.”

2012 Novel Application of Micro- and Non-Destructive Analytical Techniques for the Analysis of Iron Age Glass Beads from North-Eastern Scotland. Ph.D. dissertation. Department of Chemistry, University of Aberdeen, Aberdeen, UK.

Bertini, Martina, Andrei Izmer, Frank Vanhaecke, and Eva M. Krupp

2013 Critical Evaluation of Quantitative Methods for the Multi-Elemental Analysis of Ancient Glasses Using Laser Ablation Inductively Coupled Plasma Mass Spectrometry. *Journal of Analytical Atomic Spectrometry* 28:77-91.

Describes a fully quantitative method used for the investigation and characterization of a large set of Roman and late Iron Age glasses used in the making of Iron Age British beads (*see* Bertini et al. 2011).

Bertini, Martina, Rajmund Mokso, and Eva M. Krupp

2014 Unwinding the Spiral: Discovering the Manufacturing Method of Iron Age Scottish Glass Beads. *Journal of Archaeological Science* 43:256-266.

The innovative application of X-ray micro-computed-tomography (μCT) with synchrotron light permitted the identification of characteristic features and markings typical of specific low temperature glass working techniques, and also added to the evidence for local manufacture.

Bertini, Martina, Andrew Shortland, Karen Milek, and Eva M. Krupp

2011 Investigation of Iron Age North-Eastern Scottish Glass Beads Using Element Analysis with LA-ICP-MS. *Journal of Archaeological Science* 38(10):2750-2766; https://doi.org/10.1016/j.jas.2011.06.019.

Class 13 and 14 Iron Age Scottish glass beads are a group of highly decorated beads of British origin or design, dating indicatively to the 1st and 2nd centuries AD. Their distinctive stylistic characteristics and geographical segregation render them ideal for the investigation of whether the glasses employed in their manufacture were imported rather than produced locally, and for the assessment of the technology used in the production of the deep colors. Scotland, United Kingdom.

Bertolotti, Giulia, Maria Secchi, Maurizio Mattarelli, Roberto Dal Maschio, and Stefano Gialanella

2013 Glasses & Diamond: Issues Related to the Archaeometric Investigation of an Archaeological Bead. *Procedia Chemistry* 8:11-19.

Attempts to determine if a glassy bead recovered from the Palaeolithic rockshelter of Riparo Dalmeri in Italy is of artificial or natural origin.

Bettineschi, Cinzia, Ivana Angelini, Elisabetta Malaman, and Bernard Gratuze

2020 Composizione e provenienza dei vetri punici dalla necropoli di Nora. *Quaderni Norensi* 8:231-240; https://www.academia.edu/84070013/.

Discusses the forming techniques, the raw materials, and the provenance of the base glass of beads recovered from Tomb 9 at the Punic Nora Cemetery on Sardinia, Italy.

Bettineschi, Cinzia, Alessandra Menegazzi, Gianmario Molin, and Paola Zanovello

2014 Tra scienze e archeologia: le indagini archeometriche degli ornamenti da Tebtynis nell'ambito delle ricerche sulle collezioni egizie del Museo di Scienze Archeologiche e

d'Arte (Università di Padova). *Museologia Scientifica Memorie* 11:104-108; https://www.academia.edu/48315612/.
Reports on the identification of the materials composing beads recovered from Tebtynis (Fayyum) in Ancient Lower Egypt. Most of the specimens are made of faience but there are also examples of stone and shell beads.

Bhardwaj, H.C. (ed.)
1987 *Archaeometry of Glass.* Indian Ceramic Society, Calcutta.
A basic source for analytical data on Asian glass beads, especially for India.

Bichlmeier, S.
1997 Untersuchung merowingerzeitlicher Glasperlen unterschiedlicher Farbgruppen und Fundorte mit Hilfe der energiedispersiven Röntgenflureszenzanalyse zur Bestimmung der Glasmatrix. Diplom-Arbeit Darmstadt.
Reports on the investigation of Merovingian glass beads of different color groups and localities by means of X-ray fluorescence spectroscopy to determine the glass matrix.

Bichlmeier, S., M. Heck, and P. Hoffmann
1999 Non-Destructive Glass Matrix Determination of Beads of the Merowings Time. In *Proceedings of the European Conference on Energy Dispersive X Ray Spectrometry, Bologna, 7.-12.6.1998,* pp. 311-315.
On Merovingian glass bead composition.

Biek, Leo
1997 Gold-in-Glass Beads Rediscovered. *Current Archaeology* 13(7):268-269.
How gold- and silver-in-glass beads were identified using neutron activation when too decayed to be identified as such, even using a microscope.

Biermann, Felix, Andreas Kieseler, Ernst Pernicka, and Jasper von Richthofen
2020 Hacksilberschätze im Oder-Neiße-Gebiet aus archäologischer und archäometrischer Perspektive – das Beispiel Mahnau (Maniów) in Niederschlesien. In *Burg, Herrschaft und Zentralörtlichkeit im nördlichen westslawischen Raum*, edited by Felix Biermann, Thomas Kersting, and Anne Klammt, pp. 351-372. Beiträge zur Ur- und Frühgeschichte Mitteleuropas 92. https://www.academia.edu/62039914/.
Hacksilver material from the Oder-Neisse area of Lower Silesia, Germany, includes filigree beads which are examined from an archaeological and archaeometric perspective.

Billaud, Y. and B. Gratuze
1998 Analyses chimiques de perles en verre de l'âge du Bronze final en domaine Rhodano-Alpin. *Bulletin de liaison de la Société Française de Minéralogie et de Cristallographie* 10(1):5-6.
Chemical analysis of Late Bronze Age glass beads of the Rhodano-Alpine area of France.

Billeck, William T. and Meredith P. Luze

2019 Glass Bead Sequence for South America Based on Collections from Brazil and Guyana. *Beads: Journal of the Society of Bead Researchers* 31:100-117; https://www.academia.edu/41612354/.

Glass trade beads recovered at nine sites in Brazil and Guyana during the 1940s-1950s can be readily dated using bead chronologies developed in North America. The assemblages date to multiple time periods ranging from the early17th to the mid-20th century. Compositions were determined using pXRF.

Billeck, William T. and Kendra McCabe

2018 pXRF Analysis of Opacifiers Used in White Drawn Glass Beads in the 17th to 19th Century in the Plains and Midwest. Paper presented at the 76th Plains Anthropological Conference, San Antonio. https://www.academia.edu/41349474/.

A pXRF study of 485 beads from 14 sites demonstrates that while white beads look highly similar, their chemical composition changes over time due to the use of different opacifiers.

Biron, Isabelle, Valérie Matoïan, Julian Henderson, and Jane Evans

2009 Scientific Analysis of Glass Beads from Ras Shamra – Ugarit (Syria). *Annales du 18^{e} Congrès de l'Association Internationale pour l'Histoire du Verre, Thessaloniki 2009*, pp. 29-34; https://www.academia.edu/33688138/.

On the composition of glass beads discovered in a ceramic jug from a Late Bronze Age context.

Blackwell, Alice and Susanna Kirk

2015 Seventh Century or Seventeenth Century? Identifying Glass Beads from Scotland. *Proceedings of the Society of Antiquaries of Scotland* 145:371-399.

Reconsiders glass beads that have hitherto been regarded as early medieval in date and proposes a manufacture date for them between the 17th and 19th centuries on the basis of typological parallels and XRF and SEM-EDS surface analysis of the glass composition.

Blair, Elliot H.

2017 An XRF Compositional Analysis of Opaque White Glass Beads from 17th-Century Mission Santa Catalina de Guale, Georgia. *Beads: Journal of the Society of Bead Researchers* 29:31-48; https://www.academia.edu/43646618/.

XRF analysis of 783 specimens of four varieties of drawn white glass beads from burial contexts at the mission demonstrate that "opacifer-dating" is applicable to Spanish colonial sites in the southeastern United States.

Blair, Elliot H. and Laure Dussubieux

2022 Simple Blue (IIa40) Beads from 17th Century Mission Santa Catalina de Guale: Dating, Origins, and Elemental Composition. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather

Walder, pp. 81-100. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.9.

Discusses the results of LA-ICP-MS analysis of 20 type IIa40 beads recovered from 17th-century Mission Santa Catalina de Guale, St. Catherines Island, Georgia, considering the temporality and origins of these artifacts.

Blair, Elliot H., Richard W. Jefferies, and Christopher R. Moore

2021 Itineraries and Networks of the Mission San Joseph de Sapala Beads. In *Personal Adornment and the Construction of Identity: A Global Archaeological Perspective,* edited by Hannah V. Mattson, pp. 115-134. Oxbow Books, Oxford.

Examines the probable source of the beads recovered from a 17th-century mission site in Georgia based on compositional analysis, and investigates their biographies from production center to consumer.

Blanco, J., M.A. Lopez Alonso, M. Edo, and J.L. Fernandez Turiel

1996 Estudio analítico de determinación y de composición quimico de las cuentas de collar de calaíta y otras materia del yacimiento de La Peñas (Quiruelas de Vidriales, Zamora). *Rubricatum* 1:227-237.

On the chemical composition of callainite necklace beads and other materials from the site of La Peñas, Spain.

Blankenship, Sarah A., Bruce Kaiser, and Michael C. Moore

2013 X-Ray Fluorescence Analysis of Two Metal Beads from the David Davis Farm Site (40HA301), Hamilton County, Tennessee. *Tennessee Archaeology* 7(1):78-82; https://www.academia.edu/9714058/.

Analysis of the beads – indicative of direct or indirect Spanish contact – revealed they were manufactured from a lead-bismuth alloy plated with silver.

Blasco, A., M. Edo, J.L. Fernandez-Turiel, D. Gimeno, Feliciano Plana Llevat, and María Josefa Villalba

1992 Aplicación de técnicas geologicas al estudio de materiales arqueológicos: el ejemplo de las cuentas variscita catalanas y el complejo minero Neolítico de Can Tintorer (Gava, Barcelona). *Cuaternario y Geomorfología* 6:71-80.

The present work shows the advantages of the application of geological methods to the study of archaeological materials, in this case the study of Catalonian variscite beads and their relationship to the Neolithic mining complex at Can Tintore, Spain.

Blomme, A., P. Degryse, E. Dotsika, D. Ignatiadou, A. Longinelli, and A. Silvestri

2017 Provenance of Polychrome and Colourless 8th-4th Century BC Glass from Pieria, Greece: A Chemical and Isotopic Approach. *Journal of Archaeological Science* 78:134-146; https://www.academia.edu/36275841/.

The combined use of multiple analytical techniques allowed the elemental and isotopic characterization of a sample of polychrome and colorless glass artefacts (beads included) in order to examine their provenience.

Bondár, Mária, Attila Demény, Péter Németh, Máté Karlik, Krisztián Fintor, and Mária Tóth

2021 Különleges „gagát" gyöngy egy különleges késő rézkori sírból / Special "Jet-Like" Bead from a Special Late Copper Age Grave. *Archeometriai Műhely* XVIII(2):143-156; https://www.academia.edu/89902379/.

The burial of an 8/9-year-old child uncovered in southwestern Hungary was accompanied by a bracelet of almost pure copper, a black bead at the neck, and a bead hammered from sheet copper. Archaeometric analysis of the black bead indicates it is made from a carboniferous coal, most likely from Spain or France.

Bonneau, Adelphine, Réginald Auger, and Jean-François Moreau

2013 Rapport d'analyses sur les perles blanches de ClFi-10. In *Revue des Laboratoires d'archéologie de l'Université Laval, Vol. 1,* edited by Anne-Marie Faucher and Stéphane Noël, pp. 1-40.

Analysis of ten white glass beads from an Amerindian site in Quebec, Canada, dating to the period ca. 1600-1830 using microscopy, Raman spectroscopy, LA-ICP-MS, and neutron activation have proved to be complementary and brought new perspectives for understanding the manufacture of glass beads and their dissemination on the North American continent.

Bonneau, Adelphine, Jean-François Moreau, Réginald Auger, R.G.V. Hancock, and Bertrand Émard

2013 Analyses physico-chimiques des perles de traite en verre de facture européenne: quelles instrumentations pour quels résultats? Association des archéologues du Québec, *Archéologiques* 26:109-132; https://www.academia.edu/5832388/.

Presents the findings of previous bead studies as well as the results of an analysis of white glass beads from site ClFi-10 in Quebec, Canada, carried out by microscope, SEM-EDS, X-ray florescence, Raman spectrometry, neutron activation, and LA-ICP-MS.

2014 Investigating the Influence of Instrumental Neutron Activation Analysis on European Trade Glass Beads. *Proceedings of the 39th International Symposium for Archaeometry, Leuven (2012)*, edited by Rebecca B. Scott, Dennis Braekmans, Mike Carremans, and Patrick Degryse, pp. 180-185. Centre for Archaeological Sciences, Leuven. https://www.academia.edu/6896797/.

Ten beads recovered from an Amerindian site in Quebec were analyzed using microscopy, Raman spectroscopy, and instrumental neutron activation analysis to evaluate possible impacts of neutron activation on glass, and to assess the feasibility of Raman analyses after INAA.

Bonneau, Adelphine, Jean-François Moreau, and R.G.V. Hancock

2012 Les perles en verre de couleur du poste de traite de Chicoutimi: contribution à la datation des occupations des "premiers contacts." *Archéologiques* 25:84-105; https://www.academia.edu/5832337/.

Neutron activation studies of monochrome and bichrome royal blue, turquoise, black, and red beads from the trading post at Chicoutimi, Quebec, Canada, were conducted to determine if they are of the same time period (early 17th century) as the white beads excavated at the site.

Bonneau, Adelphine, Jean-François Moreau, Ron G.V. Hancock, and Karlis Karklins

2014 Archaeometrical Analysis of Glass Beads: Potential, Limitations, and Results. *Beads: Journal of the Society of Bead Researchers* 26:35-46; https://www.academia.edu/11496639/.

Reviews the most common analytical techniques used to study glass beads – optical microscopy, scanning electron microscopy (SEM), X-ray fluorescence (XRF), instrumental neutron activation analysis (INAA), laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS), and Raman spectroscopy – and discusses their potential, limitations, and what results may be expected.

Bonomo, Mariano, Edgardo D. Cabanillas, and Ricardo Montero

2017 Archaeometallurgy in the Paraná Delta (Argentina): Composition, Manufacture, and Indigenous Routes. *Journal of Anthropological Archaeology* 47:1-11; https://www.academia.edu/31536441/.

Concludes that the metal pendants and beads recovered from 12th-15th-century sites in the Paraná Delta were manufactured from copper by casting in open molds and hammering.

Boschetti, Cristina, Bernard Gratuze, Marco Cavalieri, Sara Lenzi, and Nadine Schibille

2021 Production or Consumption? Glass Beads from the Roman Villa of Aiano, Tuscany. *European Journal of Archaeology*; https://doi.org/10.1017/eaa.2021.34.

A glass-recycling furnace at the site in northern Italy was originally interpreted as a bead workshop. A detailed study of the typology, technology, and chemical composition of the associated beads clearly excludes local production.

Boschetti, Cristina, Bernard Gratuze, and Nadine Schibille

2020 Commercial and Social Significance of Glass Beads in Migration-Period Italy: The Cemetery of Campo Marchione. *Oxford Journal of Archaeology* 39(1); https://www.researchgate.net/publication/342918558.

Discusses the provenance, economic value, and social significance of glass beads from a cemetery in northern Italy utilized from ca. 570 to the end of the 7th century AD). The different chemical compositions and specific forming technologies have identified European, Egyptian, Mesopotamian and Asian specimens.

Bottman, Tobin C.

2006 Stable Isotope Analysis to Determine Geographic Provenience of *Olivella biplicata* Shell Beads Excavated from Archaeological Sites in the Northern Great Basin: Implications for Reconstructing Prehistoric Exchange. M.A. thesis. Department of Anthropology, University of Oregon, Eugene.

Braje, Todd J., Torben C. Rick, and Jon M. Erlandson

2008 AMS Radiocarbon Dating of Giant Rock Scallop (*Hinnites multirugosus*) Artifacts from San Miguel Island, California, USA. *Radiocarbon* 50(2):223-231; https://www.academia.edu/48278742/.

Direct accelerator mass spectrometry (AMS) radiocarbon dating of one giant rock scallop ornament and two beads from San Miguel Island extends the use of this shell for personal adornment to at least 8000 cal BP.

Brasser, Jan Paul

2015 Jet Artifacts from Two Neolithic Sites on the Dutch Coast: An Experimental Approach. M.S. thesis. Faculty of Archaeology, Leiden University, Leiden.

Attempts to source the jet used to produce various ornaments, including beads, and to determine whether the polish on these objects is intentional or the result of use. Netherlands.

Braziewicz, Janusz, Maciej Karwowski, and Marian Jaskóła

1996 Zastosowanie rentgenowskiej analizy fluorescencyjnej do określania stężenia pierwiastków w szkle zabytków celtyckich z Polski. *Archeologia Polski* 41:39-63; https://www.academia.edu/5360189/.

Applies X-ray fluorescence analysis to the determination of element concentrations in Celtic glass artifacts from Poland, beads included. English summary.

Breschini, Gary S. and Trudy Haversat

2001 AMS Radiocarbon Dates on Type G1 and K1 Olivella Shell Beads from CA-MNT-1701, Carmel Valley, Monterey County, California. http://www.californiaprehistory.com/reports01/rep0004.html, accessed 12 March 2014.

Breukel, T.W. and C.G. Falci

2017 Experimental Reproduction of Wear Traces on Shell, Coral, and Lithic Materials from the pre-Colonial Caribbean. In *Proceedings of the 26th Congress of the International Association for Caribbean Archaeology*, edited by C.B. Velasquez and J.B. Haviser. SIMARC Heritage Series15.

Reports on the experimental replication of techniques used for splitting, abrading, carving, and perforating a variety of shell species and rock types using tools made of flint, bone, coral, coarse and fine-grained sandstone, and shell.

Brill, Robert H.

1987 Chemical Analyses of Some Early Indian Glasses. In *Archaeometry of Glass*, edited by H.C. Bhardwaj, pp. 1-25. Indian Ceramic Society, Calcutta. https://www.cmog.org/library/chemical-analyses-some-early-indian-glasses.

Reports on the chemical composition of glass samples (mostly beads of the 200 BC-AD 200 period) recovered from sites in India.

1999 *Chemical Analyses of Early Glasses: Vol. 1, The Catalogue; Vol. 2, The Tables.* The Corning Museum of Glass, Corning. http://d3seu6qyu1a8jw.cloudfront.net/sites/default/files/collections/50/5052FA17-E769-478E-A9B4-0F89C6458478.pdf.

Results of a lifetime's research on glass from all areas and periods. Invaluable database for all interested in glass technology.

Brill, Robert H., I. Lynus Barnes, Stephen S.C. Tong, Emile C. Joel, and Martin J. Murtaugh

1991 Laboratory Studies of Some European Artifacts Excavated on San Salvador Island. In *Proceedings of the First San Salvador Conference: Columbus and his World*, edited by Donald C. Gerace, pp. 247-292. College of the Finger Lakes, Bahamian Field Station, Fort Lauderdale. http://www.geraceresearchcentre.com/1stColumbus.html

Presents the results of compositional analysis of the small green-glass beads recovered from a site possibly visited in 1492 by Christopher Columbus.

Brill, Robert H. and John H. Martin (eds.)

1991 *Scientific Research in Early Chinese Glass.* The Corning Museum of Glass, Corning, New York.

An important contribution to our knowledge of the chemical composition of ancient Chinese glass, including beads. Contains 12 papers presented during the Archaeometry of Glass Sessions of the 1984 International Symposium on Glass in Beijing, plus seven supplementary papers. See Sprague (1992) for a review.

Brill, Robert H., S. Shap Chow Tong, and Zhang Fukang

1989 The Chemical Composition of a Faience Bead from China. *Journal of Glass Studies* 31:11-15.

Found in Shaanxi Province, China, the blue faience bead dates to the 11th-10th centuries BC.

Brill, Robert H., Robert D. Vocke, Jr., Wang Shixiong, and Zhang Fukang

1991 A Note on Lead-Isotope Analyses of Faience Beads from China. *Journal of Glass Studies* 33:116-118.

A follow-up to the previous article.

Bruni, Y., F. Hatert, P. George, and D. Strivay

2020 The Reliquary Bust of Saint Lambert from the Liège Cathedral, Belgium: Gemstones and Glass Beads Analysis by pXRF and Raman Spectroscopy. *Archaeometry* 62(2):297-313.

Dating to the early 15th century, the bust is adorned with various stones and glass beads. The latter have a soda-lime composition, confirming that they are contemporary with the bust and imported from Venice.

Buc, Natacha, Romina Silvestre, Alejandro Acosta, and Daniel Loponte

2017 Compositional Analysis on Lithic Beads: The Case of the Lower Paraná Wetland, Argentina. In *The Exploitation of Raw Materials in Prehistory: Sourcing, Processing and Distribution*, edited by Telmo Pereira, Xavier Terradas, and Nuno Bicho, pp. 250-264. Cambridge Scholars Publishing, Newcastle upon Tyne. https://www.academia.edu/34829945/.

Aims to geochemically characterize green lithic beads made by Late Holocene hunter-gatherer groups in order to determine if they are made of copper-rich rocks and to evaluate their sources.

Bugoi, Roxana, Andrei Măgureanu, Despina Măgureanu, and Quentin Lemasson

2020 IBA Analyses on Glass Beads from the Migration Period. *Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms* 478:150-157; https://www.researchgate.net/publication/342214144.

Reports the PIXE-PIGE data obtained at AGLAE accelerator on 135 glass beads discovered at Sărata Monteoru and Bratei, Romania, dated to 6th-7th centuries AD.

Bugoi, R., A. Târlea, V. Szilágyi, I. Harsányi, L. Cliante, and Z. Kasztovszky

2022 Colour and Beauty at the Black Sea Coast: Archaeometric Analyses of Selected Small Finds from Histria. *Romanian Reports in Physics* 74(1). https://www.researchgate.net/publication/357653480.

Reports on the chemical composition of a small group of glass beads of various dates from a site in Romania.

Bulbeck, F.D., Bagyo Prasetyo, J.N. Miksic, D. Barham, and R.G.V. Hancock

2006 Analysis of Glass from Luwu, South Sulawesi, Indonesia. In *Archaeology – Indonesian Perspective: R.P. Soejono's Festschrift*, edited by Truman Simanjuntak, pp. 268-281. Indonesian Institute of Sciences, Jakarta.

Presents a thorough neutron activation analysis of 58 glass samples, mostly beads, which date to the 1st-17th centuries.

Buntem, Radchada, Blythe McCarthy, and Chawalit Khaokhiew

2016 Morphological Studies on Microstructure of Thai Ancient Glass Beads. *Key Engineering Materials* 702:8-12); https://doi.org/10.4028/www.scientific.net/kem.702.8.

Various glass beads dating to around 2500-1200 BP housed in the Banraiprachasawan museum were studied to determine their elemental compositions and morphology.

Burgess, Laurie E. and Laure Dussubieux

2007 Chemical Composition of Late 18th- and 19th-Century Glass Beads from Western North America: Clues to Sourcing Beads. *Beads: Journal of the Society of Bead Researchers* 19:58-73; https://www.academia.edu/39080229/.

The Sullivans Island (Washington) glass bead collection contains over 56,000 beads which date from the late 18th to late 19th centuries. Many of the beads conform to varieties that have been attributed to Bohemia, Venice, and China, three of the main bead-producing centers for this time period. Over 100 beads were subjected to LA-ICP-MS analysis to see if the chemical composition of the glass would be correlated with a place of origin. The results revealed several distinct compositional groups, some of which could be linked to geographical areas.

Burns, Gregory Robert

2019 Evolution of Shell Bead Money in Central California: An Isotopic Approach. Ph.D. dissertation. Department of Anthropology, University of California, Davis.

Isotopic evidence suggests most *Olivella* beads used in Central California during the Middle/Late Transition (930-685 BP) were manufactured at small, dispersed production centers from local shell sources.

Bursalı, A., H. Özbal, R. Özbal, G. Şimşek, B. Yağcı, C. Yılmaz Akkaya, and E. Baysal

2017 Investigating the Source of Blue Color in Neolithic Beads from Barcın Höyük, NW Turkey. In *The Exploitation of Raw Materials in Prehistory: Sourcing, Processing and Distribution*, edited by Telmo Pereira, Xavier Terradas, and Nuno Bicho, pp. 492-505. Cambridge Scholars Publishing, Newcastle upon Tyne.

Reports on the analysis of turquoise-blue beads found at the 7th-millennium Neolithic site of Barcın Höyük in northwestern Anatolia (Turkey), and explores the way in which the social desire for ownership of the color blue in the seemingly egalitarian and homogenous Neolithic period may have functioned.

Cagno, Simone, Peter Cosyns, Veerle Van der Linden, Olivier Schalm, Andrei Izmer, Isolde Deconinck, Frank Vanhaecke, Anna Nowak, Barbara Wagner, Ewa Bulska, Karin Nys, and Koen Janssens

2013 Composition Data of a Large Collection of Black-Appearing Roman Glass. *Open Journal of Archaeometry* 1(e22):104-108.

The collected data show that a change in the black-glass production process occurred about AD 150, involving coloration of raw glass made with iron in the secondary workshops. Furthermore, from the 4th century on there is a change in the type of raw glass used, while the coloring process was maintained.

Callmer, Johan and Julian Henderson

1991 Glassworking at Åhus, S. Sweden (Eighth Century AD). *Laborativ arkeologi* 5:143-154; https://www.academia.edu/82037452/.

Examines the beadmaking technology and chemical composition of the recovered beads.

Calo, Ambra, Peter Bellwood, James W. Lankton, Andreas Reinecke, Rochtri A. Bawono, and Bagyo Prasetyo

2020 Trans-Asiatic Exchange of Glass, Gold and Bronze: Analysis of Finds from the Late Prehistoric Pangkung Paruk Site, Bali. *Antiquity* 94(73):110-126; doi:10.15184/aqy.2019.199.

Excavations at a stone sarcophagus burial site on Bali, Indonesia, have yielded the largest collection of Roman gold-glass beads in early Southeast Asia found to date. Analyses of these finds and comparison with others from across the region provide insights into the early to mid 1st-millennium AD trans-Asiatic networks that linked Southeast Asia to South Asia, the Roman world, and China.

Calo, Ambra, Bagyo Prasetyo, Peter Bellwood, James W. Lankton, Bernard Gratuze, Thomas Oliver Pryce, Andreas Reinecke, Verena Leusch, Heidrun Schenk, Rachel Wood, Rochtri A. Bawono, I Dewa Kompiang Gede, Ni L.K. Citha Yuliati, Jack Fenner, Christian Reepmeyer, Cristina Castillo, and Alison K. Carter

2015 Sembiran and Pacung on the North Coast of Bali: A Strategic Crossroads for Early Trans-Asiatic Exchange. *Antiquity* 89(344):378-396; https://www.academia.edu/12110362/.

Provides data on the composition of both glass and gold beads recovered from burials dated to the late 2nd century BC. The findings suggest strong links with the Indian subcontinent and Mainland Southeast Asia from the late first millennium BC, some 200 years earlier than previously thought.

Campbell, Roberto, Hugo Carrión, Valentina Figueroa, Ángela Peñaloza, Maria Teresa Plaza, and Charles Stern

2018 Obsidianas, turquesas y metales en el sur de Chile. Perspectivas sociales a partir de su presencia y proveniencia en Isla Mocha (1.000-1.700 d.C.) [Obsidian, Turquoise, and Metals in Southern Chile. Social Perspectives from their Presence and Provenance in Mocha Island (AD 1000-1700)]. *Chungara Revista de Antropología Chilena*; https://www.academia.edu/36494575/.

Compositional analyses performed on obsidian pieces, turquoise beads, and metallic artefacts from Mocha Island suggest a high mobility scenario for these goods for the last 1000 years in Southern Chile.

Campbell, Stuart and Elizabeth Healey

2017 The Sources of Some Obsidian Beads Found at Kish, Southern Iraq. In *The Exploitation of Raw Materials in Prehistory: Sourcing, Processing and Distribution*, edited by Telmo Pereira, Xavier Terradas, and Nuno Bicho, pp. 538-548. Cambridge Scholars Publishing, Newcastle upon Tyne.

While technological analysis suggests that 105 beads found in a tomb of the Early Dynastic period (ca. 2700 BC) in Kish, southern Iraq, were made locally and have limited stylistic variation, pXRF analysis showed that the beads were made of obsidian that originated from four

different and diverse sources. Other exotic raw materials such as carnelian and lapis lazuli are also discussed.

Cardoso, João Luís, S. Domínguez-Bella, and J. Martínez López

2012 Ocorrência de contas de fluorite no Neolítico Final e no Calcolítico da Estremadura (Portugal). *Estudos Arqueológicos de Oeiras* 19:35-42.

Examination of a large bead from the Chalcolithic settlement of Leceia (Oeiras) by estereomicroscopy and direct X-ray diffraction revealed it is made of fluorite.

Carter, Alison K.

2010 Trade and Exchange Networks in Iron Age Cambodia: Preliminary Results from a Compositional Analysis of Glass Beads. *Bulletin of the Indo-Pacific Prehistory Association* 30:178-188; https://www.academia.edu/1801206/.

Presents the results of compositional analysis of glass beads from six Iron Age sites in Cambodia. Using LA-ICP-MS, it was possible to determine the presence of at least two glass bead-trading networks in Cambodia during the Iron Age.

2012 Garnet Beads in Southeast Asia: Evidence for Local Production. In *Crossing Borders in Southeast Asian Archaeology. Selected Papers from the 13th International Conference of the European Association of Southeast Asian Archaeologists, Berlin,* edited by Mai Lin Tjoa-Bonatz, Andreas Reinecke, and Dominik Bonatz, pp. 91-114. NUS Press, Singapore. https://www.academia.edu/2025021/.

Focuses on the analysis of two distinct types of garnet beads found at Iron Age sites in Cambodia. SEM examination and LA-ICP-MS analysis reveal that the two types are distinct from one another.

2015 Beads, Exchange Networks and Emerging Complexity: A Case Study from Cambodia and Thailand (500 bce-ce 500). *Cambridge Archaeological Journal* 25:733-757. DOI: 10.1017/S0959774315000207.

Examines beads from 12 sites in Cambodia and Thailand. Morphological and compositional analyses using LA-ICP-MS resulted in the identification of different bead types that were circulated in distinct exchange networks.

2017 Determining the Provenience of Garnet Beads Using LA-ICP-MS. In *Recent Advances in Laser Ablation ICP-MS for Archaeology,* edited by Laure Dussubieux, Mark Golitko, and Bernard Gratuze, pp. 235-266. Springer, Berlin.

Two different types of garnet beads have been identified at several Iron Age sites across Southeast Asia. Analysis of a representative sample as well as geological source samples from a variety of places confirm that the material for two bead types came from distinctly different sources, although their locations remain unknown.

Carter, Alison, Elliot H. Blair, Carla Klehm, and Lee M. Panich

2022 Glass Beads and Human Pasts. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 37-53. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://www.academia.edu/88248199/.

Reviews a variety of case studies that demonstrate how glass beads in particular have been used to examine trade and economic systems, intercultural interactions and colonialism, social identity, and technological practices.

Carter, Alison Kyra, Barbie Campbell Cole, Quentin Lemasson, and Willemijn van Noord

2018 Tracing the Trade of Heirloom Beads across Zomia: A Preliminary Analysis of Beads from the Upland Regions of Northeast India and Mainland Southeast Asia. In *The Archaeology of Portable Art: Southeast Asian, Pacific, and Australian Perspectives*, edited by Michelle Langley, Mirani Litster, Duncan Wright, and Sally K. May, pp. 49-67. Routledge, London. https://www.academia.edu/38733181/.

Aims to determine the types of glass used to produce the beads and contextualize them within the broader bead exchange taking place within the region.

Carter, Alison K. and Laure Dussubieux

2016 Geologic Provenience Analysis of Agate and Carnelian Beads Using Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry (LA-ICP-MS): A Case Study from Iron Age Cambodia and Thailand. *Journal of Archaeological Science: Reports* 6:321-330.

The study reveals that many of the beads were produced from raw material derived from the Deccan Traps, India, and that there is not yet strong evidence for bead production using a Southeast Asian source.

Carter, Alison K., Laure Dussubieux, and Nancy Beavan

2015 Glass Beads from 15th-17th Century CE Jar Burial Sites in Cambodia's Cardamom Mountains. *Archaeometry*, DOI: 10.1111/arcm.12183.

LA-ICP-MS analysis of 74 beads revealed the presence of several glass types, including two subtypes of high-alumina mineral soda glass, and lead-potash glass.

Carter, Alison, Laure Dussubieux, Thomas R. Fenn, Thanik Lertcharnrit, and T.O. Pryce

2022 The Exchange of Beads in Central Thailand in the Protohistoric Period: Glass Objects from Phromthin Tai. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 161-176. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.13.

The composition of glass beads from a multi-component site occupied from the Late Bronze Age through the mid/late 1st millennium is used to begin connecting Phromthin Tai to existing glass exchange networks.

Carter, Alison, Laure Dussubieux, Martin Polkinghorne, and Christophe Pottier

2017 Glass Artifacts at Angkor: Evidence for Exchange. *Archaeological and Anthropological Sciences* 11:1013-1027; https://www.academia.edu/79866596/.

Presents the results of an analysis of 81 glass beads and artifacts from the 9th-century royal capital of Hariharālaya and later (12th-14th centuries) contexts from the walled city of Angkor Thom, Cambodia.

Carter, Alison Kyra, Laure Dussubieux, Miriam T. Stark, and H. Albert Gilg

2021 Angkor Borei and Protohistoric Trade Networks: A View from the Glass and Stone Bead Assemblage. *Asian Perspectives* 60(1):32-70; https://muse.jhu.edu/article/793770.

Reviews data from earlier studies and adds new data on glass and stone beads from the Vat Komnou cemetery in Cambodia, as well as glass compositional analyses from the nearby site of Oc Eo, Vietnam.

Carter, Alison and James Lankton

2012 Analysis and Comparison of Glass Beads from Ban Non Wat and Noen U-Loke. In *The Origins of Angkor, Volume* 6: *The Iron Age: Summary and Conclusions,* edited by Charles Higham and Amphan Kijngam, pp. 91-114. Fine Arts Department of Thailand, Bangkok. https://www.academia.edu/7172300/.

Examines the glass beads from two Iron Age sites in northeast Thailand.

Carter, Alison, Dougald O'Reilly, Louise Shewan, and Laure Dussubieux

2022 Northwest Cambodia and the Mekong Interaction Sphere: Glass and Stone Beads from Lovea, Prei Khmeng, and Sophy. *Beads: Journal of the Society of Bead Researchers* 34:77-95.

Discusses the beads recovered from burial contexts dating to the Iron Age or protohistoric period (500 BCE-500 CE), including their typology, production technology, and chemical composition. The latter reveals that most of the glass beads are made from a high-alumina mineral-soda glass, while the stone beads were likely produced from Indian raw materials using South Asian production techniques.

Cassedy, Daniel F., Paul A. Webb, and James Bradley

1996 The Vanderwerken Site: A Protohistoric Iroquois Occupation on Schoharie Creek. *NYSAA Bulletin* 111/112:21-34; https://www.academia.edu/29218824/.

Presents a detailed analysis of a rolled-copper bead derived from Basque sources in Europe found at a protohistoric (ca. AD 1575-1600) Mohawk site in east-central New York state. The composition is compared to 28 other yellow-metal samples.

Castelo Ruano, R., C. Gutiérrez Neira, J. Barrio Martín, J. Hurtado Aguña, A.I. Pardo Naranjo, A. López Pérez, and R. García Giménez

2011-2012 Estudio arqueohistórico y analítico de un conjunto de vidrios de la villa romana de El Saucedo (Talavera La Nueva, Toledo). *CuPAUAM* 37-38:687-703.

A group of selected glasses, including several distinctive beads, from the early and late imperial, and Visigoth epochs at a site in Spain, were analyzed using MEB-EDX to determine their composition.

Cattin, Florence, Philippe Curdy, Barbara Guénette-Beck, Adrian Wichser, Andrea Utrich, Vera Hubert, Katja Hunger, Marie Wörle, Kathrin Hametner, Detlef Günther, Carmela Chateau-Smith, Igor M. Villa, and Marie Besse

2014 The Copper-Based Artefacts from Sion/Petit-Chasseur (Valais, Switzerland) during the Late Neolithic, the Bell Beaker Period and the Early Bronze Age (3200–1550 BC). In *Around the Petit-Chasseur Site in Sion (Valais, Switzerland) and New Approaches to the Bell Beaker Culture,* edited by Marie Besse, pp. 59-75. Archaeopress Archaeology, Oxford. https://www.academia.edu/9599396/.

Reports on the analysis of various artifacts, including tubular beads.

Cavalieri, Marco and Alessandra Giumlia-Mair

2009 Lombardic Glassworking in Tuscany. *Materials and Manufacturing Processes* 24:1023-1032.

Reports on the chemical composition of glass beads found in a glass workshop of the 6th-7th centuries in Tuscany, Italy.

Cerdeño, M.ª Luisa, José Antonio Martínez, Fernando Agua, Teresa Sagardoy, and Manuel Monasterio

2013 Ámbar en la Meseta Oriental durante el Bronce Final: yacimientos locales e importaciones bálticas / Amber in East Meseta during the Late Bronze Age: Local Sites and Baltic Imports. *Trabajos de Prehistoria* 69(2):375-384.

Analysis reveals that two amber beads of the Late Bronze Age from the Herrería II cemetery at Molina de Aragón, Guadalajara, Spain, are of Baltic origin.

Černá, Eva, Václav Hulínský, Kateřina Tomková, and Zuzana Cílová

2005 Early Medieval Glass Beads from Prague Castle and its Surrounding – Typological and Chemical Classification of the Finds. *Annales du 16^{e} Congrès de l'Association Internationale pour l'Histoire* du *Verre, London 2003,* pp. 335-339.

Černá, Eva, Kateřina Tomková, and Václav Hulínský

2015 Proměny skel od 11. do konce 13. století v Čechách [The Glass Transformation in Bohemia between the Eleventh Century and the End of the Thirteenth Century]. *Archeologické rozhledy* LXVII:79-108; https://www.academia.edu/16391480/.

Addresses the transformation of glassworking and glassmaking technology between the 11th and 13th centuries, in comparison with that of the 10th century. The use of non-destructive EPMA – SEM-EDS enabled the definition of several chemical types which testify to the divergent technologies and provenance of both the raw glass and artifacts, including beads. In Czech with English summary.

Chafe, Anne, Ron Hancock, and Ian Kenyon

2009 A Note on the Neutron Activation Analysis of 16th- and 17th-century Blue Glass Trade Beads from the Eastern Great Lakes. *Beads: Journal of the Society of Bead Researchers* 21:18-20. Reprinted from *The Bead Forum* 9:13-18 (1986). https://www.academia.edu/39087830/.

The beads formed two groups, those colored with cobalt and those colored with copper.

Chase, Brad, Randall Law, Franklin Hobbs, and Huifang Xu

2021 Faking It? X-Ray Diffraction Analysis of Beads from Kotada Bhadli Reveals Evidence for Imitation Steatite in Harappan Gujarat. In *Culture, Tradition, and Continuity: Disquisitions in Honour of Prof. Vasant Shinde*, edited by Prabodh Shirvalkar and Esha Prasad, pp. 175-183. B.R. Publishing, Delhi. https://www.academia.edu/60610231/.

Analysis suggests that several beads that look like typical whitened steatite beads are actually made of unfired smectitic clay (perhaps nontronite) containing quartz and anatase.

Cheng, Qian, Jin-Long Guo, Bo Wang, and Jian-Feng Cui

2012 Characteristics of Chemical Composition of Glass Finds from the Qiemo Tomb Sites on the Silk Road. *Spectroscopy and Spectral Analysis* 32(07):1955-1960; http://www.gpxygpfx.com/EN/abstract/abstract5728.shtml.

Glass beads dating between the 1st and 6th centuries AD found in the Zagunluke tomb in Xinjiang, China, had chemical composition very similar to typical soda-lime glass which indicates they were imported from the West. The glasses formed two groups based on flux source: natron glass and plant ash glass. In Chinese.

2016 Scientific Analysis of a Glass Vessel and an Eye Bead from the Zhagunluke and the Shanpula Sites from the Overland Southern Line of the Silk Road. In *Recent Advances in the Scientific Research on Ancient Glass and Glaze,* edited by Fuxi Gan, Qinghui Li, and Julian Henderson, pp. 193-206. World Century Publishing, Hackensack, NJ, and World Scientific Publishing, Singapore.

Chemical composition of objects uncovered in Xinjiang, China.

Cheng, Qian, Jin-Long Guo, Huajie Zhang, and Bo Wang

2014 The Colourful Hub of the Silk Road: A Study of Glass Beads Excavated from Two Shanpula Tomb Sites in the Khotan Area of Xinjiang, China. *Studies in Conservation* 59(S1):S25-S27.

Analysis revealed three different types of glass: natron and plant-ash types of soda-lime-silica glass from the West and a high-potash glass with a potassium-rich flux.

Cherel, Anne-Françoise, Bernard Gratuze, and Patrick Simon

2018 Les perles en faïence et en verre de l'âge du Bronze découvertes en Bretagne : Nouvelles données, nouvelles approches : Étude typo-chronologique, composition, provenance. *Bulletin de la Société préhistorique française* 115(2):327-360.

Presents new data on faience and glass beads of the Bronze Age found in Brittany, France, including typo-chronological and compositional evidence.

2018 Les perles en verre du premier âge du Fer et du début du second âge du Fer en Bretagne : étude typo-chronologique et composition. In *Céramiques gauloises d'Armorique. Les dessiner, les caractériser, les dater,* edited by Yves Menez, pp. 471-488. Presses Universitaires de Rennes, Rennes.

A typo-chronological and composition study of glass beads of the first Iron Age and the beginning of the second Iron Age in Brittany, France.

Childs, S. Terry

2011 Copper Remains on Cape Cod: A Metallurgical Analysis of Two Objects. In *Chapters in the Archeology of Cape Cod, IV: Faunal Analysis and Metallurgical Analysis from the Cape Cod National Seashore Archeological Survey,* edited by Francis P. McManamon, pp. 65-80. Cape Cod National Seashore, National Park Service, U.S. Department of the Interior, Wellfleet, MA.

One of the objects is a rolled copper bead from a prehistoric site in Massachusetts.

Chung, Kwang Yong, Hyung Tae Kang, Min Jeong Koh, and Hwa Jung Kim

2011 Chemical Compositions of Glass Beads from Tombs of Bupwha-ri Site, Yeongdong. *Journal of Archaeological Science* 27(3):243-250; https://www.e-jcs.org/journal/view.php?number=401.

Beads of the Joseon dynasty (Korea) were found to belong to the potash-glass system (K_2O-CaO-SiO_2) with HCA (High CaO and Al_2O_3) and a high concentration of MgO.

Ciarlo, Nicolás C., Patricia Solá, and Cristina Bellelli

2010 Caracterización de cuentas líticas provenientes del valle del río Manso (Provincia de Río Negro). In *La arqueometría en Argentina y Latinoamérica*, edited by Silvana Bertolino, G.R. Cattaneo and A.D. Izeta, pp. 159-164. Facultad de Filosofía y Humanidades, Universidad Nacional de Córdoba, Córdoba. https://www.academia.edu/5536198/, accessed 10 June 2017.

Microscopic and analytical examination reveal that two prehistoric stone beads found in central Argentina are made of a fine-grained metamorphic rock, possibly phyllite or slate.

Cissé, Mamadou

2010 Archaeological Investigations of Early Trade and Urbanism at Gao Saney (Mali). Ph.D. thesis. Department of Anthropology, Rice University, Houston.https://www.academia.edu/50662804/.

Dating to the period AD 700-1100, the site yielded a variety of ceramic, stone (mostly carnelian), bone, faience, and glass beads. Two appendices by Laure Dussubieux present LA-ICP-MS analysis of the glass beads.

Claassen, Cheryl

1989 Sourcing Marine Shell Artifacts. In *Proceedings of the 1986 Shell Bead Conference*, edited by Charles F. Hayes III, pp. 17-23. Rochester Museum and Science Center, Research Records 20.

Presents an introduction to the sourcing of shell on the basis of its geochemical signature. Sources of chemical variation in shell are explored, and it is suggested that species, age, and locale of collection can be determined by chemical signatures.

Coccato, Alessia, Mafalda Costa, Anastasia Rousaki, Bernard Olivier Clist, Karlis Karklins, Koen Bostoen, Ana Manhita, Ana Cardoso, Cristina Barrocas Dias, António Candeias, Luc Moens, José Mirão, and Peter Vandenabeele

2017 Micro-Raman Spectroscopy and Complementary Techniques (hXRF, VP-SEM-EDS, μ-FTIR and Py-GC/MS) Applied to the Study of Beads from the Kongo Kingdom (Democratic Republic of the Congo). *Journal of Raman Spectroscopy* 48(11):1468-1478; https://www.researchgate.net/publication/313582731.

Various analytical techniques were used to determine the chemical composition of glass beads recovered from archaeological excavations in the Democratic Republic of the Congo.

Colomban, Philippe

2016 Identification non-destructive des agents colorants. Applications aux peintures rupestres et aux perles de verre d'Afrique australe. In *Les couleurs dans les arts d'Afrique. De la Préhistoire à nos jours*, edited by Manuel Gutierrez, Michèle Ballinger, Manuel Valentin, and Mathilde Buratti, pp. 15-33. Editions des archives contemporaines, Paris.

In that colorants used in the production of glass beads vary chemically and/or technologically over time and according to the productions site, their identification can be used as a chronological marker or exchange-network tracer. In this study, glass beads from Late Iron Age sites in the upper Limpopo Valley of South Africa are assessed.

Colomban, Philippe, Grégory March, Léo Mazerolles, Tijani Karmous, Naceur Ayed, Abdelmajid Ennabli, and Hédi Slim

2003 Raman Identification of Materials Used for Jewellery and Mosaics in Ifriqiya. *Journal of Raman Spectroscopy* 34:205-213; https://www.academia.edu/8804684/.

Beads, rings, and mosaic tessarae from Tunisia (Carthage and Utica, 1st centuries BC and AD; El Djem, 2nd-3rd centuries; and Mahdia, 10th century) were analyzed by Raman spectroscopy to differentiate the various types of glasses (most have Si- and Na/Ca-rich compositions, some others contain lead).

Colomban, Philippe, Gulsu Simsek Franci, and Farahnaz Koleini

2021 On-Site Raman Spectroscopic Study of Beads from the Necropolis of Vohemar, Northern Madagascar (>13th C.). *Heritage* 4(1):524-540; https://doi.org/10.3390/heritage4010031.

Carnelian and glass trade beads were analyzed using a mobile Raman spectrometer. The results are compared with those obtained from beads excavated at different sites in Southern Africa and on Mayotte Island, and it appears that most of the beads come from southern Asia and Europe.

Conte, Sonia, Rossella Arletti, Julian Henderson, Patrick Degryse, and Annelore Blomme

2016 Different Glassmaking Technologies in the Production of Iron Age Black Glass from Italy and Slovakia. *Archaeological and Anthropological Sciences* DOI 10.1007/s12520-016-0366-4.

Presents the results of an archaeometrical investigation performed on 75 black-glass beads dated to the 9th-5th century BC coming from sites in Italy and Slovakia. The analysis provides evidence for two different production technologies in Iron Age black glass found in Italy (natron glass, probably produced in Egypt) and Slovakia (wood ash glass, probably produced in Europe).

Conte, Sonia, Rossella Arletti, Francesca Mermati, and Bernard Gratuze

2016 Unravelling the Iron Age Glass Trade in Southern Italy: The First Trace-Element Analyses. *European Journal of Mineralogy* 28; https://www.academia.edu/40984120/.

Analysis of 72 glass beads from Sarno, Cuma, and Capua (Campania, southern Italy), dated to the 9th-6th centuries BC, reveals a complex picture as regards both the chemical composition of the glass and the trade routes of Early Iron Age Campania.

Conte, Sonia, Ilaria Matarese, Simona Quartieri, Rossella Arletti, Reinhard Jung, Marco Pacciarelli, and Bernard Gratuze

2015 Bronze Age Vitreous Materials from Punta di Zambrone (Southern Italy). *European Journal of Mineralogy* 27(3):337-351; https://www.academia.edu/26052924/.

Presents the results of an archaeometrical investigation of a set of samples (9 faience beads, 1 glassy bead) from approximately 1200 BCE (Recent Bronze Age).

Conte, Sonia, Ilaria Matarese, Giovanna Vezzalini, Marco Pacciarelli, Teodoro Scarano, Alessandro Vanzetti, Bernard Gratuze, and Rossella Arletti

2019 How Much is Known about Glassy Materials in Bronze and Iron Age Italy? New Data and General Overview. *Archaeological and Anthropological Sciences* 11:1813-1841; https://doi.org/10.1007/s12520-018-0634-6.

Presents physical-chemical data for 61 vitreous beads and pendants from 11 southern Italian sites dated from the beginning of the Bronze Age up to the Archaic period (22nd-6th centuries BC).

Cooper, Anwen, Duncan Garrow, Catriona Gibson, Melanie Giles, and Neil Wilkin

2022 *Grave Goods: Objects and Death in Later Prehistoric Britain.* Oxbow Books, Oxford. http://books.casematepublishing.com/Grave_Goods.pdf.

Beads are mentioned throughout the volume which deals with the period from ca. 4000 BC to AD 43. *See* “Beads” in the index.

Cooper, H. Kory, Kenneth M. Ames, and Loren G. Davis

2015 Metal and Prestige in the Greater Lower Columbia River Region, Northwestern North America. *Journal of Northwest Anthropology* 49(2):143-166; https://www.academia.edu/17773566/.

Portable X-ray fluorescence (XRF) was used to determinere the chemical composition of yellow-metal specimens (including tubular copper beads) recovered from the Meier and Cathlapotle archaeological sites, two Chinookan sites occupied from approximately AD 1400-1820 and AD 1450-1833, respectively.

Costa, Mafalda, Ana Margarida Arruda, Luís Dias, Rui Barbosa, José Mirão, and Peter Vandenabeele

2018 The Combined Use of Raman and Micro-X-Ray Diffraction Analysis in the Study of Archaeological Glass Beads. *Journal of Raman Spectroscopy*; https://doi.org/10.1002/jrs.5446.

Proposes a new nondestructive methodology that combines micro Raman spectroscopy and micro-X-ray diffraction (μ-XRD), complemented by variable pressure scanning electron microscopy coupled with energy dispersive X-ray spectrometry, to determine the composition of glass artifacts and the manufacturing techniques employed in their production.

Costa, Mafalda, Pedro Barrulas, Ana Margarida Arruda, Rui Barbosa, Peter Vandenabeele, and José Mirão

2022 New Approaches for the Study of Faience Using Beads from Southern Portugal. *Journal of Archaeological Science: Reports* 46, 103703; https://doi.org/10.1016/j.jasrep.2022.103703.

Thirty faience beads recovered from the Iron Age necropolis of Vinha das Caliças 4 (Beja, Portugal) were analyzed to identify their production technology and provide insights into their possible provenance.

Costa, Mafalda, Pedro Barrulas, Ana Margarida Arruda, Luís Dias, Rui Barbosa, Peter Vandenabeele, and José Mirão

2021 An Insight into the Provenance of the Phoenician-Punic Glass Beads of the Necropolis of Vinha das Caliças (Beja, Portugal). *Archaeological and Anthropological Sciences* 13, 149; https://doi.org/10.1007/s12520-021-01390-5.

Analysis of the Iron Age beads revealed that all were composed of soda-lime-silica natron-based glass. This suggests the beads may have originated in glass workshops in the Levant and Egypt.

Costa, Mafalda, Pedro Barrulas, Luís Dias, Maria da Conceição Lopes, João Barreira, Bernard Clist, Karlis Karklins, Maria da Piedade de Jesus, Sónia da Silva Domingos, Luc Moens, Peter Vandenabeele, and José Mirão

2020 Determining the Provenance of the European Glass Beads of Lumbu (Mbanza Kongo, Angola). *Microchemical Journal* 154, 104531; https://www.sciencedirect.com/science/article/pii/S0026265X19323902?dgcid=coauthor#!

Trace element analysis, and rare earth element pattern analysis in particular, established that most of the European trade beads were produced in Venice, and the glass beads from types 26 and 28 have been assigned to the Bohemian glass industry.

Costa, Mafalda, Pedro Barrulas, Luís Dias, Maria da Conceição Lopes, João Barreira, Bernard Clist, Karlis Karklins, Maria da Piedade de Jesus, Sónia da Silva Domingos, Peter Vandenabeele, and José Mirão

2019 Multi-Analytical Approach to the Study of the European Glass Beads Found in the Tombs of Kulumbimbi (Mbanza Kongo, Angola). *Microchemical Journal* 149; doi.org/10.1016/j.microc.2019.103990.

Analysis revealed the various colorants and opacifiers used in the production of the glass as well as suggesting the place of manufacture of some of the bead types.

Costa, Mafalda, Pedro Barrulas, Maria da Conceição Lopes, João Barreira, Maria da Piedade de Jesus, Sónia da Silva Domingos, Peter Vandenabeele, and José Mirão

2023 Personal Adornments in West-Central Africa – The Case Study of a Talc Bead from the Kongo Kingdom (Mbanza Kongo, Angola). *Archaeological and Anthropological Sciences* 15, 22; https://www.academia.edu/102832264/.

A multi-analytical study suggests that this gold-colored talc bead constitutes the first evidence of local production of personal ornaments in the Kongo kingdom and one of the first examples of craft specialization for such purposes in central and southern Africa since prehistoric times.

Cosyns, Peter and Bernard Gratuze

2005 La composition chimique des perles en verre de la tombe à char de la nécropole de Neufchâteau-Le Sart par LA-ICP-MS. *Arduinna* 63:1-7.

On the chemical composition of glass beads from the necropolis at Neufchâteau-Sart, Belgium.

Craig, Jennifer

2021 Refining the Chronology and Distribution of Mid-Fifteenth to Mid-Seventeenth Century Indian Ocean World Glass. *Antiquity* 95(384); https://doi.org/10.15184/aqy.2021.155.

Reports on the morphological and compositional analysis of glass beads from three shipwrecks located off the Philippines: Pandanan (1460-1487), Santa Cruz (1488-1505), and Royal Captain Shoal Wreck 2 (1573-1620).

Craig, Jennifer and Laure Dussubieux

2022 Shifting Patterns of Glass Bead Cargo of 15th-17th Century Philippines Shipwrecks. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 177-196. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.14.

Compositional analysis of 85 glass beads recovered from three shipwrecks is combined with an examination of the ceramic and glass cargo patterns of the wrecks to help recreate ancient exchange routes.

Cruz, Mario da and Bernard Gratuze

2016 Perles de verre préromaines de *Conimbriga* (Portugal). *Bulletin de l'AFAV*, 2016:7-9; afaverre.fr/pdf/bull2016/2016-01-da%20cruz.pdf.

Presents the chemical analysis of a group of pre-Roman glass beads found at a major Roman settlement in Portugal. They date from the Iron Age to the 1st century AD.

Cui, Jianfeng, Chuankun He, Kehong Liu, and Xiaohong Wu

2008 Scientific Analysis of Some Ancient Glass Beads Unearthed from Taiwan. *Nanfangwenwu* (Cultural Relics of Southern China) 4:109-114.

Eighteen ancient glass beads unearthed from Taiwan Province are analyzed using laser ablation.

Cui, Jianfeng, Xiaohong Wu, and Baoling Huang

2011 Chemical and Lead Isotope Analysis of Some Lead-Barium Glass Wares from the Warring States Period, Unearthed from Chu Tombs in Changde City, Hunan Province, China. *Journal of Archaeological Science* 38(70):1671-1679.

Analysis reveals that all samples are PbO-BaO-SiO_2 glasses; i.e., traditional ancient Chinese glasses. The results suggest that all Bi wares may either share a common source or were produced according to similar recipes. In turn, the eye beads tested have a different chemical composition.

Cultraro, Massimo

2007 Evidence of Amber in Bronze Age Sicily: Local Sources and the Balkan-Mycenaean Connection. In *Between the Aegean and Baltic Seas: Prehistory across Borders*, edited by Ioanna Galanaki, Helena Tomas, Yannis Galanakis, and Robert Laffineur, pp. 377-387. Aegaeum 27. https://www.academia.edu/39678843/.

Surveys the finds (mostly beads) of Sicilian amber (simetite) and reports on its chemical composition.

Dadiego, Danielle Lynn

2020 Beads, Bullets, and Brokerage: Exploring Economic Agency in Eighteenth-Century West Florida. Ph.D. dissertation. Department of Anthropology, University of California, Santa Cruz. https://escholarship.org/uc/item/8qm5q59w.

Explores the effectiveness of Spanish economic institutions in a borderland region based on archival research, traditional artifact analysis, and LA-ICP-MS isotopic analysis of glass beads.

2021 A Chemical Comparison of Black Glass Seed Beads from North America and Europe. *Beads: Journal of the Society of Bead Researchers* 33:54-63; https://www.academia.edu/74271216/.

Explores the elemental composition of black seed beads from three 18th-century sites in Pensacola, Florida, and compares the assemblage to a small sample of similar glass beads recovered from three sites in the United States as well as four potential glass production locations in Europe.

Dadiego, Danielle L., Alyssa Gelinas, and Tsim D. Schneider

2021 Unpacking the Bead: Exploring a Glass Bead Assemblage from Mission Santa Cruz, California, Using LA-ICP-MS. *American Antiquity* 86(2):413-424; https://doi.org/10.1017/aaq.2020.110.

Focuses on the morphometric and elemental analysis of white glass beads collected from an adobe structure at Mission Santa Cruz which operated between 1791 and the 1830s in the colonial province of Alta (upper) California.

Daggett, Adrianne, Marilee Wood, and Laure Dussubieux

2021 Learning from Glass Trade Beads at Thabadimasego, Botswana. In *African Archaeology Without Frontiers: Papers from the 2014 PanAfrican Archaeological Association Congress*, edited by Karim Sadr, Amanda Esterhuysen, and Chrissie Sievers, pp. 127-142. Wits University Press, Johannesburg. https://www.academia.edu/56868738/.

Reports the results of recent laser ablation-inductively coupled plasma-mass spectrometry analysis (LA-ICP-MS) of an assemblage of glass beads from an Early Iron Age site in northeast Botswana. The indication that the site participated in some of the earliest manifestations of the vast Indian Ocean trade network.

Dalton-Carriger, Jessica N.

2016 New Perspectives on the Seventeenth-Century Protohistoric Period in East Tennessee: Redefining the Period through Glass Trade Bead and Ceramic Analyses. Ph.D. dissertation, Department of Anthropology, University of Tennessee, Knoxville. https://www.academia.edu/29303019/.

Examines new fields of evidence and employs new dating methods in order to fully understand the protohistoric period in East Tennessee. Using both pXRF and LA-ICP-MS analyses of the glass trade beads, this study creates a chronological sequence of chemical patterns corresponding to Native American habitation.

Dalton-Carriger, Jessica N. and Elliot H. Blair

2014 Search for the Protohistoric Period in East Tennessee: Answering Chronological Questions via pXRF and LA-ICP-MS Analyses. Paper presented at the 71st Annual Meeting of the Southeaster Archaeological Conference, Greenville, South Carolina. https://www.academia.edu/9394078/.

Analysis of 282 glass trade beads from eastern Tennessee and surrounding states has revealed trends in their chemical composition which can be correlated to date ranges.

2022 Glass Trade Bead Analysis at Upper Hampton Farm (40RH41): A Case Study for 17th and 18th Century Non-Cherokee Habitation in East Tennessee Valley. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 101-118. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.10.

LA-ICP-MS analysis of a small sample of IIa40 glass beads from the site suggests a significant 17th-century occupation of the site, a finding that does not conform to the standard ideas of abandonment and Cherokee re-occupation and instead hints at a continued 17th- century occupation of the lower East Tennessee Valley.

d'Ambrosio, Beatrice and S. Sfrecola

1987-1988 Le collane eneolitiche e del Bronzo Antico della Liguria: materie prime e fonti di approvigionamento. *Rivista di Scienze Preistoriche* 41:331-344.

Analysis of Eneolithic beads by X-ray diffraction identified 12 raw materials (mostly stone) and suggests possible provenance in and around Liguria, Italy.

Damick, Alison and Marshall Woodworth

2015 Steatite Beads from Tell Fadous-Kfarabida: A Case Study in Early Bronze Age Technology in Northern Coastal Lebanon. *Journal of Archaeological Science: Reports* 3:603-614; https://www.academia.edu/15767268/.

SEM/EDX and XRD analysis of seven small stone beads revealed that six were made from fired steatite (synthetic enstatite) while the seventh was formed of quartz-based faience or frit.

Dardeniz, Gonca and Aliye Öztan

2020 Acemhöyük Fayans ve Frit Eserleri Üzerine Arkeolojik ve Arkeometrik Değerlendirmeler [Archaeological and Archaeometric Investigations of Acemhöyük Faience and Frit Artefacts]. *Türk Tarih Kurumu Belleten* 84(301):837-886; https://www.academia.edu/44692584/.

Elemental analysis of faience beads and other objects suggests at least two different workshops for the Acemhöyük vitreous materials during the early 2nd Millennium BC. In Turkish with an English abstract.

Dardeniz, Gonca, T. Yildirim, C. Yildirim, and E. Çiftçi

2021 Techniques of Blue, Green, and White Faience Bead Production Used at the Early Bronze Age Central Anatolian Site of Resuloğlu (Turkey). *Archaeometry* 63(2):327-342; https://doi.org/10.1111/arcm.12606.

Analysis of the microstructure and chemical compositions of 26 morphologically similar, colored beads revealed local faience bead production using efflorescence and cementation glazing techniques.

Daszkiewicz, Małgorzata and Miriam Lahitte

2013 Possibilities and Limitations of Using pXRF for Analysis of Ancient Beads. An Example from Gala Abu Ahmed, Sudan. In *Archäometrie und Denkmalpflege 2013*, edited by Andreas Hauptmann, O. Mecking, and Matthias Prange, pp. 269-273. Metalla, Sonderheft 6.

Daszkiewicz, Małgorzata, Miriam Lahitte, and Rudolf Naumann

2021 Analysis of Ancient Beads from Gala Abu Ahmed, Sudan, Using pXRF and XRD. In *Using pXRF for the Analysis of Ancient Pottery: An Expert Workshop in Berlin 2014*, edited by Morten Hegewisch, Małgorzata Daszkiewicz, and Gerwulf Schneider, pp. 241-248. Edition Topoi, Berlin. https://www.academia.edu/46890616/.

Analysis of beads of various materials revealed that pXRF results could be used to group the beads, but additional analyses, such as XRD and SEM-EDX, are required to accurately determine what materials are.

Davis, Mary and Ian C. Freestone

2018 Trading North: Glass-Working beyond the Edge of the Empire. In *Things that Travelled: Mediterranean Glass in the First Millennium CE*, edited by Daniela Rosenow, Matt Phelps, Andrew Meek, and Ian Freestone, pp.107-133. UCL Press, London. https://www.jstor.org/stable/j.ctt21c4tb3.12; https://www.academia.edu/90305312/.

Reports on the chemical composition of a unique assemblage of glass beads and glass fragments from Culduthel, an Iron Age site in northeast Scotland.

Davis, Mary, Fraser Hunter, and Alec Livingstone

1995 The Corrosion, Conservation and Analysis of a Lead and Cannel Coal Necklace from the Early Bronze Age. *Studies in Conservation* 40(4):257-264.

Discusses a two-strand necklace of lead and cannel coal beads found around the neck of a small child in southeast Scotland. The beads represent the earliest known use of metallic lead in Britain and Ireland.

Dayet, Laure, Rudolph Erasmus, Aurore Val, Léa Feyfant, Guillaume Porraz

2017 Beads, Pigments and Early Holocene Ornamental Traditions at Bushman Rock Shelter, South Africa. *Journal of Archaeological Science: Reports* 13:635-651.

The ostrich-eggshell, giant land-snail, and marine-shell beads recovered from the site were subjected to a technological and use-wear study with chemical analyses (SEM-EDS and Raman analyses) of the colored residues they bear.

Děd, Jiří, Estelle Ottenwelter, and Ludmila Šejvlová

2015 Early Medieval Silver Pearl from Lumbe's Garden Cemetery at Prague Castle: Composition, Manufacture, Deterioration and Conservation. *Studies in Conservation* 61:174-183; https://www.academia.edu/15346392/.

Presents a detailed study of an openwork silver bead found with the burial of a wealthy female interred during the 9th century. Czechia.

Dekówna, Maria

1993 Les perles en verre de la nécropole du 7ème dt du 9ème siècle à Zalakomar (Hongrie). *Annales du 12^{e} Congrès de l'Association Internationale pour l'Histoire du Verre, Vienne - Wien, 26-31 août 1991,* pp. 271-278.

On the composition of glass beads from a necropolis in Hungary of the 7th-9th centuries.

2010 The Glass from Cösitz (Zörbig), Sachsen-Anhalt, and the Origins of Non-Alkaline Lead-Silica Glass from European Finds. The State of Research in Outline. *Archaeologia Polona* 48:269-287.

Delves into the origins of lead-silica glass in early medieval Europe, spurred by the finding of a bead made of high-quality PbO-SiO_2 glass found at a medieval (9th century) stronghold in eastern Germany.

2018 Bead Variety of Dark Glass Decorated with Glass Thread. Problems of Origin and Chronology. In *The Historical Glass: A Multidisciplinary Approach to Historical Glass III*, edited by Danica Staššíková-Štukovská, pp. 127-144. Slovak Arts Council, Bratislava.

Discusses distinctive wound beads found at sites of the late Roman and early medieval times in central Europe. Includes chemical analysis.

Dekówna, Maria and Tomasz Purowski

2012 Glass and Quartz Finds from Janów Pomorski Site 1. In *Studia nad Truso/Truso Studies I,* edited by Mateusz Bogucki and Beata Jurkiewicz, pp. 244-260. Museum of Archaeology and History in Elbląg, Poland.

Presents detailed chemical analyses of a variety of glass beads recovered from contexts ranging from the prehistoric period to the Early Middle Ages at a site in northern Poland.

2014 Glass Beads. In *Bodzia: A Late Viking-Age Elite Cemetery in Central Poland,* edited by Andrzej Buko, pp. 222-261. Brill, Leiden.

Delgado Robles, Alma A., Jose Luis Ruvalcaba Sil, Pieterjan Claes, Mayra D. Manrique Ortega, Edgar Casanova González, Miguel Ángel Maynez Rojas, Martha Cuevas García, and Sabrina García Castillo

2015 Non-Destructive in Situ Spectroscopic Analysis of Greenstone Objects from Royal Burial Offerings of the Mayan Site of Palenque, Mexico. *Heritage Science* 3(20); https://www.academia.edu/57382334/.

Several spectroscopic techniques, such as Raman, Fourier transform infrared (FTIR), X-ray fluorescence (XRF), and color measurements, were used to identify specific minerals used to create beads and pendants during the period AD 600-850 and their sources.

Demarchi, Beatrice, Sonia O'Connor, Andre de Lima Ponzoni, Raquel de Almeida Rocha Ponzoni, Alison Sheridan, Kirsty Penkman, Y. Hancock, and Julie Wilson

2014 An Integrated Approach to the Taxonomic Identification of Prehistoric Shell Ornaments. *PLoS ONE* 9(6):1-12; https://www.academia.edu/7405538/.

Worked shell beads lose taxonomic clues to identification and this may be compounded by taphonomic alteration. This article reports the use of bulk amino acid composition of the stable

intra-crystalline proteins preserved in shell biominerals to demonstrate that taxonomic identification can be achieved at the genus level. The study is based on beads discovered at the Early Bronze Age site of Great Cornard, United Kingdom.

Demény, Attila, Bernadett Bajnóczi, Sándor Kele, István Fórizs, Gabriella Barna, and Zoltán Siklósy

2009 Stable Isotope Analysis of Carbonatic Ornaments from the Late Copper Age Cemetery at Budakalász. In *The Copper Age Cemetery at Budakalász*, edited by Mária Bondár and Pál Raczky, pp. 437-448. Pytheas, Budapest.

Concludes that stable isotope geochemistry, especially if used in combination with cathodoluminescence microscopy, can be a useful tool for provenance studies. In the case of the Budakalasz samples, analysis enabled the secure identification of the limestone and shell beads. Hungary.

Denbow, J., K. Klehm, and L. Dussubieux

2015 The Glass Beads of Kaitshàa: New Insights on Early Indian Ocean Trade into the Far Interior of Southern Africa. *Antiquity* 89:361-337.

Using compositional analysis of glass beads from an Iron Age site in the central Kalahari Desert, Botswana, the authors argue that the site exemplifies the role of heterarchy and indigenous agency in the evolving political economy of the subcontinent.

Denbow, James, Jeannette Smith, Nonofho Mathibidi Ndobochani, Kirsten Atwood, and Duncan Miller

2008 Archaeological Excavations at Bosutswe, Botswana: Cultural Chronology, Paleo-Ecology and Economy. *Journal of Archaeological Science* 35(2):459-480; ttps://www.academia.edu/3776224/.

Reports the chemical composition of the copper and bronze beads recovered from Lose period (AD 1200-1650) contexts.

d'Errico, F., M. Vanhaeren, K. Van Niekerk, C.S. Henshilwood, and R.M. Erasmus

2014 Assessing the Accidental Versus Deliberate Color Modification of Shell Beads. A Case Study on Perforated *Nassarius kraussianus* from Blombos Cave Middle Stone Age Levels. *Archaeometry* 57(1):51-76.

Comparing modern shells experimentally heated in oxidizing and reductive atmospheres with shell beads from the 72-ka-old Middle Stone Age levels of Blombos Cave, South Africa, reveals that although some shell beads were heated, intentional heat treatment of shell beads is not demonstrated.

Dias, M.I., Zs. Kasztovszky, M.I. Prudêncio, I. Harsányi, I. Kovács, Z. Szőkefalvi-Nagy, J. Mihály, G. Káli, A.C. Valera, and A.L. Rodrigues

2018 Investigating Beads from Chalcolithic Funerary Cremation Contexts of Perdigões, Portugal. *Journal of Archaeological Science: Reports* 20:434-442.

A set of burned beads of uncertain composition were found to be made of shell.

Dillis, Sarah, Alicia Van Ham-Meert, Peter Leeming, Andrew Shortland, GelaGobejishvili, Mikheil Abramishvili & Patrick Degryse

2019 Antimony as a Raw Material in Ancient Metal and Glass Making: Provenancing Georgian LBA Metallic Sb by Isotope Analysis. *STAR: Science & Technology of Archaeological Research*; https://www.tandfonline.com/doi/full/10.1080/20548923.2019.1681138.

Focuses on the Caucasus as case study by applying mineralogical, geochemical, and isotopic analysis to Georgian ores (mainly from the Racha-Lechkumi district) and Late Bronze Age (15th-10th centuries BCE) metallic Sb objects (including beads) found at the sites of Brili and Chalpiragorebi.

Dominguez-Bella, Salvador

2010 Objetos ornamentales en el Calcolítico del centro de la Península Ibérica. Estudio analítico de las cuentas de collar de los enterramientos prehistóricos del Valle de las Higueras. In *Minerales y Rocas en las Sociedades de la Prehistoria,* edited by S. Dominguez-Bella, J. Ramos Muñoz, J.M. Gutiérrez López, and M. Pérez Rodríguez, pp. 275-285. Universidad de Cádiz, Cádiz.

Reports on the analytical study of necklace beads accompanying Chalcolithic burials of the central Iberian Peninsula, Spain.

Domínguez-Bella, Salvador, M.A. Álvarez Rodríguez, and J. Ramos Muñoz

2001 Estudio analítico de las cuentas de collar de ámbar del dolmen de Alberite (Villamartín, Cádiz). Naturaleza química y mineralógica e implicaciones sobre su origen. In *III Congreso Nacional de Arqueometría (Sevilla 1999)*, edited by B. Gómez Tubío, M.A. Respaldiza, and M.L. Pardo, pp. 621-630. Seville.

Presents the analytical study of an amber bead necklace from the Alberite dolmen, Villamartin, Cádiz, Spain.

Domínguez-Bella, Salvador and María José Bóveda

2011 Variscita y ámbar en el Neolítico gallego. Análisis arqueométrico del collar del túmulo 1 de Chousa Nova, Silleda (Pontevedra, España). *Trabajos de Prehistoria* 68(2):369-380.

Presents the results of the archaeometrical analysis of a necklace composed of variscite and amber beads that accompanied a female Galician-Neolithic burial in Spain.

Domínguez-Bella, S., J. Ramos Muñoz, M.A. Álvarez, and M. Forteza

1998 Neolithic Amber. Mineralogical and Chemical Characterization of Amber Necklace Beads from Alberite Dolmen. Villamartín, Cádiz, Spain. Libro de Abstracts del *World Congress on Amber Inclusions,* p. 155. Vitoria.

Domínguez-Bella, Salvador, Guirec Querré, Thomas Calligaro, and Javier Martinez López
2019 Iberian Variscite: ICP-MS-LA and Pixe Analysis of Recent Prehistory Beads et Pendants from Spain and Portugal. In *La parure en callaïs du Néolithique européen*, edited by Guirec Querré, Serge Cassen, and Emmanuelle Vigier, pp. 201-240. Archaeopress Publishing, Summertown, Oxford.

Domínguez-Bella, S. and M. Marta Sampietro Vattuone
2005 Collar Beads from the Tafí Culture, Tucumán (Argentina) (1 Millennium AD): Raw Materials Characterization and Provenance. In *Proceedings of the 33rd International Symposium on Archaeometry, 22-26 April 2002, Amsterdam*, edited by H. Kars and E. Burke. Geoarchaeological and Bioarchaeological Studies 3.
Discusses the composition of stone beads from sites in northwestern Argentina and their probable source.

Dong, Junqing, Yunling Han, Jiwang Ye, Qinghui Li, Song Liu, and Donghong Gu
2014 In Situ Identification of Gemstone Beads Excavated from Tombs of the Han Dynasties in Hepu County, Guangxi Province, China Using a Portable Raman Spectrometer. *Journal of Raman Spectroscopy* 45(7); https://www.academia.edu/7558305/.
Beads from the beryl and quartz groups were identified with some thoughts on their origin. The present research provides valuable information on the early trade between south China and South Asia.

Dong, Junqing, Yang Yiming, and Feng Enxue
2007 Study on Glass Beads of Six Dynasties from Leijiaping Site. *Jianghan Kaogu (Jianghan Archaeology)* 3(104):79-86.
Presents the results of XRD and XRFS analysis of the fine glass beads of the Six Dynasties excavated from the Leijiaping site in China and discusses their features as well as material. In Chinese.

Douka, Katerina, Christopher A. Bergman, Robert E. M. Hedges, Frank P. Wesselingh, and Thomas F. G. Higham
2013 Chronology of Ksar Akil (Lebanon) and Implications for the Colonization of Europe by Anatomically Modern Humans. *PLoS ONE* 8(9):e72931.
The remains of two anatomically modern humans found at Ksar Akil are estimated to date between 40.8-39.2 ka cal BP (68.2% prob.) and between 42.441.7 ka cal BP (68.2% prob.), respectively, based on radiocarbon dates derived from marine shell beads.

Duckworth, Chloë N.
2011 The Created Stone: Chemical and Archaeological Perspectives on the Colour and Material Properties of Early Egyptian Glass, 1500-1200 B.C. Ph.D. thesis. University of Nottingham.

ToF-SIMS is used to investigate the origin of the colorant-opacifiers used in Egyptian glass production, beads and amulets included. ToF-SIMS is used to investigate the origin of the colorant-opacifiers used in Egyptian glass production, beads and amulets included. Also examines color in Egyptian thought, the relative value of Lower Bronze Age glass, the significance of the material properties of glass, and beadmaking technology.

Duckworth, Chloë N., A. Cuénod, and D.J. Mattingly

2014 Non-Destructive μXRF Analysis of Glass and Metal Objects from Sites in the Libyan Pre-Desert and Fazzan. *Libyan Studies* 45:1-20.

Reports on the composition of imported Roman glass beads from sites in Libya.

Duckworth, Chloë N., Julian Henderson, Frank J.M. Rutten, and Kalliopi Nikita

2012 Opacifiers in Late Bronze Age Glasses: The Use of ToF-SIMS to Identify Raw Ingredients and Production Techniques. *Journal of Archaeological Science* 39:2143-2152.

Time of Flight Secondary Ion Mass Spectrometry (ToF-SIMS) was used to study four samples of opaque glass, two derived from beads.

Duckworth, Chloë N., David J. Mattingly, and Victoria C. Smith

2015 From the Mediterranean to the Libyan Sahara. Chemical Analyses of Garamantian Glass. *Journal of Archaeological Science: Reports* 7:633-639; https://www.academia.edu/57502930/.

Presents the results of electron microprobe analysis of 124 samples of glass (including eight beads) from surface collection survey or unstratified contexts at two sites in the Fazzan region of Libya, most from the Saharan oasis belt of the Wadi al-Ajal.

Dunster, Joanna

2016 Appendix A: Chemical Analysis of Beads from the Whitehorse Hill Cist. In *Preserved in the Peat: An Extraordinary Bronze Age Burial on Whitehorse Hill, Dartmoor, and its Wider Context,* edited by Andy M. Jones. Oxbow Books, Oxford.

On the composition of beads found with an Early Bronze Age burial in southwestern England associated with an unparalleled range of artifacts. United Kingdom.

Dussubieux, Laure

2001 L'apport de l'ablation laser couplée à l'ICP-MS à la caractérisation des verres : application à l'étude du verre archéologique de l'Océan Indien. Ph.D. dissertation. University of Orléans, Orléans. https://www.academia.edu/103894317/.

Discusses the LA-ICP-MS analytical process and its application to the study of glass (beads included) from sites in Central, Southern, and Southeast Asia. The time span covered extends from the 4th century BC to beyond the first millennium AD.

2009 Chemical Investigation of Some 17th-century French Glass Personal Ornaments. *Journal of Glass Studies* 51:95-110.

Presents the chemical analysis of a small group of glass beads, buttons, and small ornaments found in Rouen, France, and compares them to beads from glassmaking factories in Holland.

2010 Glass Material from Singapore. *Archipel* 80:197-209.

Reports on the chemical analysis of glass beads and vessel fragments from 14th-century contexts in Singapore using LA-ICP-MS.

2016 Potash Glass: A View from South and Southeast Asia. In *Recent Advances in the Scientific Research on Ancient Glass and Glaze,* edited by Fuxi Gan, Qinghui Li, and Julian Henderson, pp. 95-111. World Century Publishing, Hackensack, NJ, and World Scientific Publishing, Singapore. https://www.academia.edu/25089534/.

In South and Southeast Asia, between the 4th century BC and the 3rd century AD, two main types of glass dominate and were used in bead manufacture: mineral soda-alumina (m-Na-Al) and potash. This article stresses the latter as it has not been well discussed previously.

2021 Elemental Compositions and Glass Recipes. In *Ancient Glass of South Asia: Archaeology, Ethnography and Global Connections*, edited by Alok Kumar Kanungo and Laure Dussubieux, pp. 153-174. Springer Nature, Singapore. https://doi.org/10.1007/978-981-16-3656-1_5.

A group of glass beads from the ancient city of Kish in Iraq with an uncertain chronology and provenience was analyzed using LA-ICP-MS. Based on the elemental composition of the glass, they are attributed to the 2nd-1st centuries BCE with South or Southeast Asia as the source.

2022 South Asian Beads at the Site of Kish, Iraq. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 365-382. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.23.

Kish was occupied from the Ubaid (6500-3800 BCE) to the Abbasid (750-1258 CE) period. The compositions of the drawn glass beads excavated there confirm their South Asian origin and reveal that bead circulation between India and the Middle East occurred over a long period, showing a sustained glass connection between the two regions.

Dussubieux, Laure and Bérénice Bellina

2018 Glass Ornament Production and Trade Polities in the Upper-Thai Peninsula during the Early Iron Age. *Archaeological Research in Asia* 13:25-36.

Khao Sek, located in the Upper-Thai Peninsula, yielded an impressive quantity of glass waste and ornaments suggesting that glass bracelets and beads were manufactured at the site as early as the 4th c. BCE. This article discusses the recovered material using typological observation as well as elemental analysis using LA-ICP-MS.

Dussubieux, Laure, Bérénice Bellina, Win Hsan Oo, U Maung Sun Win, Htet Myet Tut, Kalayar Myat Myat Htwe, and Khinsandar Kyaw

2020 First Elemental Analysis of Glass from Southern Myanmar: Replacing the Region in the Early Maritime Silk Road. *Archaeological and Anthropological Sciences* 12(7), article 139; https://www.researchgate.net/publication/342280987.

Analysis of glass beads and wasters recovered from two neighboring late prehistoric/ protohistoric sites using laser ablation-inductively coupled plasma-mass spectrometry has revealed two different patterns. There is a combination of potash and m-Na-Ca-Al glasses at Aw Gyi, while at Maliwan the glass types are more diversified with some of them found generally during the 4th-2nd centuries BC. It is possible the beads are of local manufacture.

Dussubieux, L., M. Blet-Lemarquand, and B. Gratuze

2011 Innovation dans les techniques de coloration: les verres rouges et orange en Asie du Sud. In *Les Innovations verrières et leur devenir, Actes du deuxième Colloque International de l'Association Verre & Histoire, Paris,* edited by A.-L. Carré, S. Lagabrielle, C. Maitte, and M. Philippe.

Discusses the composition of red and orange glass which was primarily used for the production of beads and bracelets in Southeast Asia between the 4th century BC and the 5th century AD.

Dussubieux, Laure, Thomas R. Fenn, Shinu Anna Abraham, and Alok Kumar Kanungo

2022 Tracking Ancient Glass Production in India: Elemental and Isotopic Analysis of Raw Materials. *Archaeological and Anthropological Sciences* 14, 226; https://www.academia.edu/91790217/.

To determine a more precise provenience attribution and the identification of regionally distinct production centers for drawn Indo-Pacific beads in India, raw material samples were collected from selected regions within the subcontinent and analyzed using LA-ICP-MS.

Dussubieux, Laure and Mark Golitko

2017 Scientific Analyses and Stone Beads. In *Stone Beads of South and Southeast Asia: Archaeology, Ethnography and Global Connections*, edited by Alok Kumar Kanungo, pp. 389-400. Indian Institute of Technology Gandhinagar.

Explains the different analytical methods used to determine the chemical composition of stone beads, using lapis lazuli from sites around the world as a case study.

Dussubieux, Laure and Bernard Gratuze

2003 Nature et origine des objets en verre retrouvés à Begram (Afghanistan) et à Bara (Pakistan). In *De l'Indus à l'Oxus: Archéologie de l'Asie Centrale,* edited by O. Bopearachchi, C. Landes, and C. Sachs, pp. 315-323. Association Imago, Musée de Lattes, Lattes.

Reports on the chemical composition and origin of glass objects, including glass beads, from two sites which were occupied between the 2nd century BC and the 2nd century AD.

2003 Non-Destructive Characterization of Glass Beads – An Application to the Study of Glass Trade between India and Southeast Asia. In *Fishbones and Glittering Emblems: Southeast Asian Archaeology 2002,* edited by A. Karlstrom and A. Kallen, pp. 135-139. Museum of Far Eastern Antiquities, Stockholm.

2010 Glass in Southeast Asia. In *50 Years of Archaeology in Southeast Asia: Essays in Honour of Ian Glover,* edited by B. Bellina, E.A. Bacus, T.O. Pryce, and C.J. Wisseman, pp. 247-259. River Books, Bangkok.

Reports on the chemical composition of ancient glass. Data from beads are included.

2012 Chemical Composition of 16th- to 18th-Century Glass Beads Excavated in Paris. *Beads: Journal of the Society of Bead Researchers* 24:26-38; https://www.academia.edu/12738152/.

Dating from the 16th to 18th centuries, 63 glass artifacts (mostly beads) recovered from two sites in Paris, France, were investigated using LA-ICP-MS analysis in an attempt to determine their source. Although provenance attribution was difficult due to a lack of comparative data, it was possible to identify an increasing variety of glass recipes after the 16th century.

2013 Glass in South Asia. In *Modern Methods for Analysing Archaeological and Historical Glass, Vol. I,* edited by Koen Janssens, pp. 399-413. Wiley Online Library.

After describing the origins of glass in South Asia, the dominant compositions encountered among the glass artifacts (mostly constituted of beads, bangles, and other personal ornaments) of this region are described and attention is devoted to the finds encountered at Arikamedu and related archaeological sites. India, Pakistan, and Sri Lanka.

Dussubieux, L., B. Gratuze, and M. Blet-Lemarquand

2010 Mineral Soda Alumina Glass: Occurrence and Meaning. *Journal of Archaeological Science* 37:1645-1655; https://www.academia.edu/5075111/.

Data obtained using LA-ICP-MS compositional analysis on a large corpus of artifacts (including beads) shows that at least five sub-groups of m-Na-Al glass can be identified using the concentrations of calcium, magnesium, uranium, barium, strontium, zirconium, and cesium.

Dussubieux, Laure and Karlis Karklins

2016 Glass Bead Production in Europe during the 17th Century: Elemental Analysis of Glass Material Found in London and Amsterdam. *Journal of Archaeological Science: Reports* 5:574-589; https://www.academia.edu/20594011/.

Compares the bead chemistries of glass beads recovered from 17th-century production sites in London, England, and Amsterdam, Netherlands.

Dussubieux, L., C.M. Kusimba, and V. Gogte, S.B. Kusimba, B. Gratuze, and R. Oka

2008 The Trading of Ancient Glass Beads: New Analytical Data from South Asian and East African Soda-Alumina Glass Beads. *Archaeometry* 50(5):797-821; https://www.academia.edu/5075112/.

The occurrence of similar glass beads at archaeological sites in Africa and South Asia bears witness to the trade relationship between the two continents. This paper reports elemental analysis results from an in-depth LA-ICP-MS study of a group of archaeological glass beads with a specific alumina-rich composition from East Africa, India, and Sri Lanka.

Dussubieux, L., J.W. Lankton, B. Bellina-Pryce, and B. Chaisuwan

2012 Early Glass Trade in South and Southeast Asia: New Insights from Two Coastal Sites, Phu Khao Thong in Thailand and Arikamedu in South India. In *Crossing Borders: Selected Papers from the 13th International Conference of the European Association of Southeast Asian Archaeologists, Volume 1,* edited by Mai-Lin Tjoa-Bonatz, Andreas Reinecke, and Dominik Bonatz, pp. 307-328. NUS Press, Singapore. https://www.academia.edu/97978424/.

The composition of glass artifacts (beads included) recovered from Phu Khao Thong (ca. 2nd century BC-4th century AD) is compared to that of beads from contemporary sites, especially Arikamedu.

Dussubieux, Laure and Thomas Oliver Pryce

2016 Myanmar's Role in Iron Age Interaction Networks Linking Southeast Asia and India: Recent Glass and Copper-Base Metal Exchange Research from the *Mission Archéologique Française au Myanmar*. *Journal of Archaeological Science: Reports* 5:598-614.

Presents a regionally original combination of elemental and isotopic analyses from glass and copper-base metal grave goods (including glass beads) excavated at a series of Iron Age cemeteries in the Samon Valley of central Myanmar.

Dussubieux, Laure, P. Robertshaw, and M.D. Glascock

2008 LA-ICP-MS Analysis of African Glass Beads: Laboratory Inter-Comparison with an Emphasis on the Impact of Corrosion on Data Interpretation. *International Journal of Mass Spectrometry* 284:152-161.

Dussubieux, Laure, Katharina Schmidt, Yorke M. Rowan, Alexander M.R. Wasse, and Gary O. Rollefson

2018 Two Glass Beads from Wisad Pools in the Jordanian Black Desert. *Journal of Glass Studies* 60:303-306.

Discusses the chemistry of two blue-glass beads found in a tomb in eastern Jordan tentatively dated to the Late Bronze Age IIA period (ca. 14th century BC). The composition corresponds to an Iron Age glass quite probably using mineral soda.

Dussubieux, Laure and Ery Soedewo

2016 The Glass Beads of Kampai Island, Sumatra. *Archaeological and Anthropological Sciences* 10(5):1129-1139; https://www.academia.edu/38688455/.

Glass beads dating from the 11th-14th centuries were analyzed using LA-ICP-MS. Results show that the vast majority were produced in western India; some others in northeastern India and a few in the Middle East.

Dussubieux, Laure and Heather Walder (eds.)

2022 *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange.* Studies in Archaeological Sciences, Leuven University Press, Leuven. https://www.jstor.org/stable/j.ctv2z9fzr0.

Provides a wide range of case studies in the investigation and interpretation of glass bead composition, production, and exchange since ancient times. The individual articles are annotated elsewhere in this bibliography.

Dussubieux, Laure, Menno Welling, Potiphar Kaliba, and Jessica C. Thompson

2022 European Trade in Malawi: The Glass Bead Evidence. *African Archaeological Review* 40(2):377-396; https://doi.org/10.1007/s10437-022-09486-6.

LA-ICP-MS analysis of beads from rock shelters revealed that all but one originated in Europe. The exception had a composition typical of South Asia during the 15th-17th centuries.

Dussubieux, Laure and Marilee Wood

2021 Indian Glass: Chronology and Distribution in Eastern Africa. In *Ancient Glass of South Asia: Archaeology, Ethnography and Global Connections*, edited by Alok Kumar Kanungo and Laure Dussubieux, pp. 511-532. Springer Nature, Singapore.

The elemental analysis via LA-ICP-MS of ancient glass beads from archaeological sites in Kenya, Tanzania, and on the island of Mayotte revealed the presence of two different types of mineral soda/high alumina (m-Na-Al) glasses that likely originated in India.

Eddy, John J.

2009 Source Characterization of Santa Cruz Island Chlorite Schist and its Role in Stone Bead Ornament Exchange Networks. In *Proceedings of the 7th California Islands Symposium*, edited by C.C. Damiani and D.K. Garcelon, pp. 67-79. Institute for Wildlife Studies, Arcata, CA. https://www.academia.edu/75147057/.

Reports the preliminary results of southern California chlorite schist and soapstone/steatite LA-ICP-TOFMS chemical composition analysis as it relates to Middle to Late Holocene beads.

2013 The Early Middle Period Stone Bead Interdependence Network. M.A. thesis. Department of Anthropology, California Sate University, Northridge. https://www.academia.edu/5100654/.

Explores southern California early Middle period gifting and reciprocal exchange networks and the underlying motivations responsible for the creation, maintenance, and possible rejection of

social relationships. LA-ICP-MS was used to identify soapstone source locations used in the production of stone beads (Sierra Pelona).

Eerkens, Jelmer W., Gregory S. Herbert, Jeffrey S. Rosenthal, and Howard J. Spero

2005 Provenance Analysis of *Olivella biplicata* Shell Beads from the California and Oregon Coast by Stable Isotope Fingerprinting. *Journal of Archaeological Science* 32(10):1501-1514.

This study examines the potential of stable carbon and oxygen isotopes to source *Olivella* beads from the Pacific coast.

Eerkens, Jelmer W., Jeffrey S. Rosenthal, Howard J. Spero, Ryoji Shiraki, and Gregory S. Herbert

2007 Shell Bead Sourcing: A Comparison of Two Techniques on *Olivella biplicata* Shells and Beads from Western North America. In *Archaeological Chemistry: Analytical Techniques and Archaeological Interpretation*, edited Michael D. Glascock, Robert J. Speakman, and Rachel S. Popelka-Filcoff, pp. 167-193. American Chemical Society, Washington, DC. https://www.academia.edu/1038695/.

Two methods are used to track the geographic source of *Olivella biplicata* beads along the California and Oregon Pacific coast: bulk element composition by inductively coupled plasma-mass spectrometry (ICP-MS) and stable carbon and oxygen isotopes by isotope ratio-mass spectrometry (IR-MS).

Eerkens, Jelmer W., J.S. Rosenthal, H.J. Spero, N.E. Stevens, R. Fitzgerald, and L. Brink

2009 The Source of Early Horizon Olivella Beads: Isotopic Evidence from CCO-548. *Proceedings of the Society for California Archaeology* 23:1-11; https://www.academia.edu/23467554/.

Analysis focused on a small sample of beads from an Early Horizon (ca. 4000 B.P.) site on Marsh Creek in the California Delta as a test case. Results suggest production not on the Pacific Coast, but in a protected bay or estuary with significant influx of freshwater.

Eerkens, Jelmer W., J.S. Rosenthal, N.E. Stevens, A. Cannon, E.L. Brown, and H.J. Spero

2010 Stable Isotope Provenance Analysis of *Olivella* Shell Beads from the Los Angeles Basin and San Nicolas Island. *Journal of Island and Coastal Archaeology* 5:105-119.

Examining the spatial distribution of bead types is one way to track beads to their locus of production. Chemical and stable isotopic methods provide an additional and independent means of testing hypotheses generated by spatial distributions. This study uses stable oxygen, carbon, and strontium isotope data to reconstruct provenance zones for 18 *Olivella biplicata* beads from southwestern California.

Ehrhardt, Kathy, Samuel K. Nash, and Charles P. Swann

2000 Metal-Forming Practices among the Seventeenth Century Illinois, 1640±1682. *Materials Characterization* 45:275-288; https://www.academia.edu/23839144/.

A sample of 64 copper-based metal artifacts (including beads and pendants) excavated at the Haas/Hagerman Site, Clark County, Missouri, were examined metallographically to determine their composition and identify manufacturing techniques and technical processes employed by the Illinois to produce these new forms.

Ekmen, H., C. Diker, F.G. Ekmen, and C. Tunoğlu

2020 New Evidence of Chalcolithic Age Steatite Beads from Inönü Cave: Typology and Technology Aspects with Archaeometric Techniques. *Mediterranean Archaeology and Archaeometry* 20(2):113-129; https://www.academia.edu/43123540/.

SEM-EDS analysis of seven beads was performed to understand steatite bead production techniques during the Chalcolithic Age in western Turkey.

Eliyahu Behar, A., S. Elbaz, I. Shai, A.M. Maeir, and H.J. Greenfield

2015 Faience Beads from Early Bronze Age Contexts at Tell es-Safi/Gath, Israel. *Journal of Archaeological Science: Reports*; https://www.academia.edu/18846974/.

A group of faience beads securely dated to the Early Bronze Age III were subjected to analysis by FTIR spectrometry in order to identify the mineralogy and materials used in their manufacture.

Eremin, Katherine, Patrick Degryse, Nathaniel Erb-Satullo, Monica Ganio, Joseph Greene, Andrew Shortland, Marc Walton, and Lawrence Stager

2012 Iron Age Glass Beads from Carthage. In *Historical Technology, Materials and Conservation: SEM and Microanalysis,* edited by Nigel Meeks, Caroline Cartwright, Andrew Meek, Aude Mongiatti, pp. 30-35. Archetype Publications, London. https://www.academia.edu/6475727/.

Presents the analysis of glass beads recovered from funerary urns at the Tophet of Carthage, Tunisia. They date to the 8th-4th centuries BC.

Erlandson, Jon M., Michael E. Macko, Henry C. Koerper, and John Southon

2005 The Antiquity of *Olivella* Shell Beads at CA-ORA-64: AMS Radiocarbon Dated between 9420 and 7780 cal BP. *Journal of Archaeological Science* 32:393-398; https://www.academia.edu/16970010/.

AMS analysis of the spire-removed *Olivella* beads produced a consistent series of Early Holocene dates that includes some of the oldest securely dated shell beads in North America.

Essel, Elena, Elena I. Zavala, Ellen Schulz-Kornas, Maxim B. Kozlikin, Helen Fewlass, Benjamin Vernot, Michael V. Shunkov, Anatoly P. Derevianko, Katerina Douka et al.

2023 Ancient Human DNA Recovered from a Palaeolithic Pendant. *Nature*; https://doi.org/10.1038/s41586-023-06035-2.

Application of a non-destructive method for the gradual release of DNA trapped in ancient bone and tooth artefacts to an Upper Palaeolithic deer-tooth pendant from Denisova Cave, Russia,

resulted in the recovery of ancient human and deer mitochondrial genomes, which allowed the estimation of the age of the pendant at approximately 19,000-25,000 years BP.

Falci, Catarina Guzzo

2015 Stringing Beads Together: A Microwear Study of Bodily Ornaments in Late pre-Colonial North-Central Venezuela and North-Western Dominican Republic. M.A. thesis. Faculty of Archaeology, Leiden University. https://openaccess.leidenuniv.nl/handle/1887/35076.

A *chaîne opératoire* approach is integrated in order to assess technological choices, gestures, techniques, toolkits, and skill levels.

Falci, Catarina Guzzo, Annelou Van Gijn, M. Magdalena Antczak, Andrzej T. Antczak, and Corinne L. Hofman

2017 Challenges for Microwear Analysis of Figurative Shell Ornaments from pre-Colonial Venezuela. *Journal of Archaeological Science: Reports* 11:115-130.

Microwear analysis is used to assess production technologies and use-wear of figurative shell beads and pendants from north-central Venezuela.

Fenn, Thomas R.

2011 Applications of Heavy Isotope Research to Archaeological Problems of Provenance and Trade on Cases from Africa and the New World. Ph.D. dissertation. School of Anthropology, University of Arizona, Tucson.

Lead and strontium isotope analysis were made on archaeological materials from three different contexts in both the Old and New Worlds including glass beads from late 1st millennium AD Igbo-Ukwu, Nigeria.

Fenn, Thomas R., Laure Dussubieux, Heather Walder, and Douglas D. Anderson

2022 Glass Beads and Evidence for Early "Pre-Contact" Trade in Northwestern Alaska. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 137-158. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.12.

Summarizes the results of compositional analysis of 13 glass beads recovered from the site of Igliqtiqsiuġvigruak near Kiana, northwestern Alaska, and places them within a historical context.

Fenn, Thomas R., Peter Robertshaw, Marilee Wood, John Chesley, and Joaquin Ruiz

2011 Glass Beads from Igbo-Ukwu, Nigeria: Provenance and Long-Distance Trade in the Late First Millennium AD. *In* Applications of Heavy Isotope Research to Archaeological Problems of Provenance and Trade: Cases from Africa and the New World, by T.R. Fenn. Ph.D. dissertation. University of Arizona, Tucson.

The three analytical datasets presented suggest that the raw glass and beads were produced in several regions: the Eastern Mediterranean/Levant, Middle East, and India.

Fertelmes, Craig M. and Chris Loendorf

2012 *EDXRF Analysis of Disk Beads and Turquoise Artifacts from AZ U:9:90 (ASM), Maricopa County, Arizona.* Material Science Laboratory, Gila River Indian Community, Cultural Resource Management Program, Sacaton, Arizona. Submitted to EcoPlan Associates, Inc., Mesa, AZ, pXRF Analysis Report No. 2012-04.

Figueiredo, M.O., J.P. Veiga, and J.P. Mirão

2006 Modelling the Size of Red-Colouring Copper Nanoclusters in Archaeological Glass Beads. *Applied Physics A: Materials Science & Processing* 83(4):499-502.

A non-destructive X-ray absorption study was undertaken on the red layer from a singular five-layered, twisted, square-sectioned chevron bead from a 16th-century archaeological context in Lisbon, Portugal.

Figueiredo, M.O., J.P. Veiga, and Teresa P. Silva

2012 Chromophore Behaviour of Iron, Copper, Cobalt and Antimony in Ancient Tile, Faience and Porcelain Glazes Plus Archaeological Glass Beads: An Overview on X-ray Absorption Near-Edge Spectroscopy Studies. *Ciência & Tecnologia dos Materiais* 24(3/4):124-127; https://repositorio.lneg.pt/bitstream/10400.9/1690/1/35436.pdf.

Includes the chemical analysis of a five-layered, twisted, square-sectioned chevron bead from a 16th-century archaeological context in Lisbon, Portugal.

Fioretti, Anna Maria, Ivana Angelini, Maurizio Battisti, and Fabiana Zandonai

2016 18. Perlina anulare di enstatite: Caratterizzazione mineralogica e chimica e ipotesi su tecnica di produzione e zona di provenienza. In *Ricerche archeologiche a sant'andrea di loppio (Trento, Italia) il castrum tardoantico-altomedievale,* edited by Barbara Maurina, pp. 687-695. Archaeopress Publishing, Oxford.

Micro-FTIR, micro-Raman, and XRD analyses indicate that a problematic bead is made of synthetic enstatite. While found in a stratigraphic layer that may be dated to 5th-6th centuries AD, based on comparisons with other prehistoric artefacts found in Loppio and the surrounding areas the bead is likely to date ca. 3300-2300 BC.

Fischbach, Noémi, Anh-Tu Ngo, Philippe Colomban, and Martial Pauly

2016 Beads Excavated from *Antsiraka Boira* Necropolis (Mayotte Island, 12th-13th Centuries): Colouring Agents and Glass Matrix Composition Comparison with Contemporary Southern Africa Sites. *ArchéoSciences: Revue d'archéométrie* 40:83-102; https://www.researchgate.net/publication/313164917.

Provides the chemical composition of glass beads excavated on Mayotte Island in the Indian Ocean off the east coast of Africa. Most of the beads can be classified as "Indo-Pacific."

Fischer, A. and W.P. McCray

1999 Glass Production Activities as Practiced at Sepphoris, Israel (37 BC - AD 1516). *Journal of Archaeological Science* 26(8):893-906.

Concentrates on glass vessels but Sepphoris also made glass beads and bracelets of a soda-lime-silica type with manganese as a decolorizer. There is much consistency of composition over long periods.

Fischer, P.M., M. Bichler, and V.M.F. Hammer

2008 Early Bronze Age Necklace from Tell Abu al-Kharaz, Jordan Valley. In *Tell Abu al-Kharaz in the Jordan Valley, Volume 1: The Early Bronze Age*, by P.M. Fischer, pp. 387-389. Austrian Academy of Sciences Press, Vienna. https://www.academia.edu/21753487/.

Describes the results of various archaeometric methods applied to the glass and shell beads comprising the necklace.

Fitzgerald, Richard T., Terry L. Jones, and Adella Schroth

2005 Ancient Long-Distance Trade in Western North America: New AMS Radiocarbon Dates from Southern California. *Journal of Archaeological Science* 32(3):423-434; https://www.academia.edu/15551246/.

Eleven *Olivella biplicata* spire-lopped shell beads from six inland in southern California produced AMS dates between 11,200 and 7,860 cal BP. These findings represent some of the earliest unequivocal evidence for long-distance trade in western North America and push the antiquity of this important form of inter-group interaction back several thousand years earlier than previously thought.

Flensborg, G. and C. Wagner

2015 Cuentas vítreas asociadas a entierros humanos en el curso inferior del río Colorado (transición pampeano-patagónica oriental) [Glass Beads Associated with Human Burials in the Lower Course of the Colorado River (Eastern Pampa-Patagonian Transition)]. *Intersecciones en Antropología* 16:481-489.

Presents the results of the morphological, microstructural and chemical analyses of glass beads recovered from two archaeological sites on the lower Colorado River, Argentina, which constitute the first record of this kind of evidence in the area.

Fórizs, István

2008 Üvegkészítés Magyarországon a kezdetektől a XVIII. századig. *A Miskolci Egyetem Közleménye A sorozat, Bányászat* 74:113-136.

Reviews glassmaking (including glass beads) in Hungary from its beginnings until the 18th century as regards the raw materials and colorants used. In Hungarian with English abstract.

Fórizs, I., A. Pásztor, G. Nagy, and M. Tóth

2000 Avar kori üveggyöngyök röntgendiffrakciós és elektron-mikroszondás vizsgálata. Alapadatok az üveggyöngyök genetikájához III. Az üveggyöngyök zárványai? *Heves Megyei Régészeti Közlemények* 2:147-171.

On X-ray diffraction and electron microprobe analysis of inclusions in Avar glass beads, Hungary.

2000 Avar kori üveggyöngyök röntgendiffrakciós és elektron-mikroszondás vizsgálata. Alapadatok az üveggyöngyök genetikájához IV. Miből és hogyan? In *Hadak útján (A népvándorlás kor fiatal kutatóinak X. konferenciája, Domaszék, 27-30 November 1999,* edited by L. Bende, G. Lőrinczy, and Cs. Szalontai, pp. 321-340.

Reports on the X-ray diffraction and electron microprobe study of Avar glass beads; basic data on how they were made and of what. Hungary.

2001 Avar és szarmata gyöngyök Csongrád megyéből Az anyaguk is különbözik vagy csak a típusuk? In *A Wosinsky Mór Múzeum Évkönyve - Hadak Útján* XXIII:69-89. Wosinsky Mór Megyei Múzeum, Szekszárd.

Avar and Sarmatian glass beads from Csongrád County, Hungary: are only the styles different or the material as well?

2006 Üveganyag újrafelhasználása az avar és szarmata kori üveggyöngyök mikroszöveti és (geo)kémiai vizsgálata tükrében. *Arrabona Múzeumi Közlemények* 44(1):141-150.

Concerns the chemical composition of reused Avar and Sarmatian beads in Hungary.

Fórizs, I., A. Pásztor, M. Tóth, and G. Nagy

2001 Avar kori üveggyöngyök röntgen-diffrakciós és elektron-mikroszondás vizsgálata. Alapadatok az üveggyöngyök genetikájához I. In *Együtt a Kárpát-medencében – A Népvándorlás kor Fiatal Kutatóinak VII*, edited by M. Kiss and P. Lengvári, pp. 49-68.

Reports on the basic characteristics of Avar glass beads in Hungary using X-ray diffraction and electron microprobe analysis.

Fórizs, I., M. Tóth, G. Nagy, and A. Pásztor

1999 Avar kori üveggyöngyök röntgendiffrakciós és elektron-mikroszondás vizsgálata. Alapadatok az üveggyöngyök genetikájához II. Vörös opak üvegek. In *A népvándorlás kor fiatal kutatóinak 8. találkozójának előadásai (Veszprém, 28-30 November 1997)*, edited by Á. Perémi, pp. 87-110.Veszprém Megyei Múzeumi Igazgatóság, Laczkó Dezső Múzeum, Veszprém.

Reports on the composition of opaque red Avar glass beads in Hungary determined by X-ray diffraction and electron microprobe analysis.

Fox, William A., R.G.V. Hancock, and L.A. Pavlish

1995 Where East Met West: The New Copper Culture. *The Wisconsin Archaeologist* 76(3-4):269-293.

Artifacts of Lake Superior native copper (15th-17th centuries) are compared with assemblages of reworked European copper from 16th-century Ontario sites in an effort to determine the degree of paradigmatic continuity evidenced in the manipulation of these materials.

Frána, J., A. Maštalka, and N. Venclová

1987 Neutron Activation Analysis of Some Ancient Glasses from Bohemia. *Archaeometry* 29(1):69-89.

Includes results of analyses of 21 yellow beads with stratified blue/white eyes (Late Hallstatt - Early La Tène Period) and 2 ring beads (Late La Tène Period).

Francis, Peter, Jr.

1998 Analyses of Indo-Pacific Beads. *The Margaretologist* 11(1):9-14; https://beadresearch.org/resources/the-margaretologist/.

Reports the chemical composition of beads from several sites in South and Southeast Asia analyzed using neutron activation.

Franjić, Ana

2020 Iron Age Glass Technology in South East Europe. Ph.D. thesis. University College London. https://discovery.ucl.ac.uk/id/eprint/10110003/.

Presents a comprehensive study of Iron Age glass technology in southeast Europe, examining the chemical composition of glass beads of the first millennium BCE from the territories of present-day Bosnia and Herzegovina, Croatia, and Slovenia. Restricted access.

Franjić, Ana, Ian C. Freestone, Borut Križ, and Petra Stipančić

2022 The Spectrometric Analysis of Iron Age Glass Beads from Novo Mesto, Slovenia. *Studia Universitatis Hereditati* 10(1):23-29; https://www.academia.edu/101651778/.

This study indicates that raw glass was imported to Novo Mesto from eastern Mediterranean centers and corroborates the existence of long-distance trade during the 1st millennium BCE.

Frantz, Tony, Dorothy H. Abramitis, Linda Borsch, and Mark T. Wypyski

2009 Roman Variscite Beads: In Situ Analysis by X-Ray Microdiffraction. *Metropolitan Museum of Art Bulletin* 67(1):20-25.

Fraser, Sharon, Dave Polya, Paul Lythgoe, and Timothy Insoll

2005 Preliminary Work for the LA-ICP-MS Analysis of Carnelian Archaeological Artefacts. In *Plasma Source Mass Spectrometry: Current Trends and Future Developments,* edited by G. Holland and D.R. Bandura, pp. 213-224. RSC Publishing, Cambridge.

Investigates the use of LA-ICP-MS analysis to source carnelian using beads and raw material from Gujarat, India, and beads from Mali.

Freestone, Ian C.

2006 An Indigenous Technology? A Commentary on Lankton *et al.* "Early Primary Glass Production in Southern Nigeria." *Journal of African Archaeology* 4(1):139-141.

A critique of Lankton, Ige, and Rehren (2006).

Freestone, I.C. and J.R.N. Peake

2014 Opaque Yellow Glass Production in the Early Medieval Period: New Evidence. In *Neighbours and Successors of Rome: Traditions of Glass Production and Use in Europe and the Middle East in the Later 1st Millennium AD*, edited by D. Keller, J. Price, and C. Jackson, pp. 15 - 21. Oxbow Books, Oxford.

Reports on the SEM analysis of several Anglo-Saxon yellow glass beads of the 5th-7th centuries from Eriswell, Suffolk, England, United Kingdom.

Frey, Annette and Susanne Greiff

2012 Early Medieval Glass Beads with Metal Tubes. *Annales du 18^{e} Congrès de l'Association Internationale pour l'Histoire du Verre*, *Thessaloniki 2009*, pp. 373-378.

On unusual glass beads with a copper-tube core recovered from an early medieval graveyard in Tiengen, near Freiburg, Germany. Includes chemical analyses.

Frînculeasa, Alin and Claudia Stihi

2012 Vitreous Beads Found at the Bronze Age Cemetery from Câmpina (Prahova). *Annales d'Université Valahia Targoviste, Section d'Archeologie et d'Histoire* XIV(2):17-27.

Discusses the chronological position and chemical composition of beads recovered from a funerary complex in Romania.

Furihata, Junko and Takayashu Koezuka

2005 Material Analysis of Dodama Beads Recovered from the Kofun Period. Nara National Research Institute for Cultural Properties, *Annual Bulletin* 2005:42.

Japan; ca. 3rd-6th centuries.

Fürst, Sebastian, Katharina Müller, Liliana Gianni, Céline Paris, Ludovic Bellot-Gurlet, Christopher F.E. Pare, and Ina Reiche

2016 Raman Investigations to Identify *Corallium rubrum* in Iron Age Jewelry and Ornaments. *Minerals* 6(2), article 56; https://www.academia.edu/48533313/.

Proposes a non-destructive multi-stage approach to identify archaeological corals among other biominerals used as ornament during the central European Iron Age with emphasis on optical examination and mobile Raman spectroscopy.

Fusco, Maria and Robert J. Speakman

2010 The Application of X-Ray Fluorescence (XRF) Spectrometry in the Characterization of Glass Degradation in Beaded African Art. *The Bead Forum* 56:1, 3, 6-12; https://beadresearch.org/the-bead-forum-archive/.

Discusses the potentials and limitations of XRF analysis in glass compositional analyses, coating identification, and the detection of pesticide residue on ethnographic art.

Gak, E.I., R.A. Mimokhod, and A.A. Kalmykov

2014 Сурьма в бронзовомвеке Кавказа и юга Восточной Европы [Antimony in the Bronze Age of the Caucasus and Southeastern Europe]. *Nartamongæ* XI(1-2):87-132; https://www.academia.edu/36999271/.

Discusses the various forms of metallic antimony beads and pendants and their distribution, as well as their chemical composition. English summary.

Galibin, Valentin A.

1995 Data from the Analysis of Ancient Glass and the Problems of Interpreting Them. *In* Glass Beads: Cultural History, Technology, Experiment and Analogy, edited by M. Rasmussen, U.L. Hansen, and U. Näsman, pp. 89-91. Historical-Archaeological Experimental Center, *Studies in Technology and Culture* 2.

Gallaga Murrieta, Emiliano and Emiliano Ricardo Melgar Tísoc

2020 Pasando la turquesa: Objetos Azules del Valle de Ónavas, Sonora, México / Turquoise Passing by: Blue Items from the Onavas Valley, Sonora, Mexico. *Clio Arqueológica* 35(2):122-151; https://www.academia.edu/44535911/.

Reports on the composition, possible sources, and manufacturing techniques of 14 turquoise pieces (including pendants, beads, and raw material) recovered during an archaeological survey in northern Mexico. In English.

Gan, Fu-Xi

2009 The Glass and Jade Road – The Cultural and Technical Exchange of Silicate Based Artifacts with Outside China Before Pre-Qin Period. *Journal of Guangxi University for Nationalities (Natural Science Edition)* 4.

Concentrates on the origin of materials and production technology related to ancient Chinese glasses including glass beads. The earliest glass beads unearthed from the Kiziltur cemetery in Xinjiang Province, China, dating to the time of the West Zhou to Spring and Autumn periods (1100-800 BC), were made locally; the glassmaking technology was obtained from West Asia.

2016 The Ancient Glass Road: The Cultural and Technical Exchange of Chinese Glass and Faience with Outside China before the Han Dynasty (200 B.C.). In *Recent Advances in the Scientific Research on Ancient Glass and Glaze,* edited by Fuxi Gan, Qinghui Li, and Julian Henderson, pp. 1-16. World Century Publishing, Hackensack, NJ, and World Scientific Publishing, Singapore.

Provides data on the chemical composition of faience beads, tubes, and pendants recovered from various sites in China.

Gan, FuXi, HuanSheng Cheng, YongQing Hu, Bo Ma, and DongHong Gu

2009 Study on the Most Early Glass Eye-Beads in China Unearthed from Xu Jialing Tomb in Xichuan of Henan Province, China. *Science in China Series E: Technological Sciences* 52(4):922-927.

The structure and the chemical composition of the eye beads were analyzed by X-ray diffraction (XRD) and the Proton Induced X-ray Emission (PIXE) technique. The results show that they belong to the soda-lime silicate system (Na_2O-CaO-SiO_2). Comparing the decorative design and the chemical composition of the samples with those from ancient Babylon and ancient Egypt, the likelihood is that these ancient eye beads from Xichuan were imported from the West.

Gan, Fuxi, Qinghui Li, Donghong Gu, Ping Zhang, Huansheng Cheng, Bin Zhang, and Bo Ma

2003 Study on Early Glass Beads Unearthed from Baicheng and Tacheng of Xinjiang. *Journal of the Chinese Ceramic Society* 31(7):663-668.

Dating to around 1100-500 BC, the glass beads could be sorted into two groups: Na_2O-CaO-SiO_2 and Na_2O-CaO-PbO-SiO_2. In Chinese.

Garbacz-Klempka, Aldona, Józef S. Suchy, Janusz Kozana, Marcin Piękoś, Stanisław Wilk, and Małgorzata Perek-Nowak

2017 Analysis of Eneolithic Copper Jewellery Artifacts from Książnice Cemetery in South Poland. *International Journal of Metalcasting* 11(2):366-370; https://www.academia.edu/32052739/.

Reports on the metallographic analysis of copper ornaments including two rolled copper beads. *See also* Wilk and Garbacz-Klempka (2016).

García González, Julia, Alberto Dorado Alejos, Luis Mª Cobos Rodríguez, and Víctor López López

2021 Cuentas de pasta vítrea y fayenza en contextos postalayóticos (siglos VII-II a. n. e.): el conjunto de So na Caçana (Alaior, Menorca) / Glass Paste and Fayenza Beads in Postalayotic Contexts (7th-2nd Centuries BC): A Set from So na Caçana (Alaior, Menorca). *CuPAUAM* 47(2):123-149; https://doi.org/10.15366/cupauam2021.47.2.004.

Presents a thorough analysis of a set of beads that comprised a necklace, including their chemical composition. Included are glass eye beads and faience melon beads.

García-Heras, Manuel, Fernando Agua, Hilario Madiquida, Víctor M. Fernández, Jorge de Torres, María-Ángeles Villegas, and Marisa Ruiz-Gálvez

2021 Characterization of Glass, Shell, and Fishbone Beads on Ibo Island (Northern Mozambique) in the Context of the Indian Ocean Trade. *African Archaeological Review*; https://doi.org/10.1007/s10437-021-09430-0.

The chemical composition of the glass beads and their chromophores, and the shell and fishbone materials, are studied to understand the local and trading provenance of these items. They are dated to the 11th and 12th centuries AD.

García-Heras, Manuel, Fernando Agua, Hilario Madiquida, Víctor M. Fernández, María-Ángeles Villegas, and Marisa Ruiz-Gálvez

2022 Archaeometric Characterization of Glass and a Carnelian Bead to Study Trade Networks of two Swahili Sites from the Ibo Island (Northern Mozambique). *Boletín de la Sociedad Española de Cerámica y Vidrio*; https://doi.org/10.1016/j.bsecv.2022.09.001.

Four different glass types were identified: mineral-soda alumina glass from Western India, vegetal-soda alumina glass from Central Asia, a conventional soda-lime silicate glass coming probably from Europe, and a lead silicate glass of the PbO-SiO_2 binary system most likely from Venice.

García-Heras, M., J.M. Rincón López, A. Jimeno Martínez, and M.A. Villegas Broncano

2003 Estudio arqueométrico de cuentas de vidrio procedentes de la necrópolis de Numancia (siglo II a.C.). *Trabajos de prehistoria* 60(1):173-181; https://www.academia.edu/92087698/.

Reports on the archaeometric study of glass beads from the necropolis of Numantia (2nd century BC), Spain.

2005 Pre-Roman Coloured Glass Beads from the Iberian Peninsula: A Chemico-Physical Characterisation Study. *Journal of Archaeological Science* 32(5):727-738; https://www.academia.edu/53771576/.

Presents results derived from a chemical and microstructural study of a representative sample of glass beads from the 2nd-century BC Celtiberian necropolis of Numantia (Upper Duero Valley, Spain). The evidence suggests that Numantian glass beads were the result of trade or exchange practices rather than locally produced.

Garrido-Cordero, J.A., C.P. Odriozola, A.C. Sousa, and V.S. Gonçalves

2020 Fluorite and Translucent Beads in Iberian Late Prehistory. *Materials and Manufacturing Processes* 35(13):1424-1430; https://doi.org/10.1080/10426914.2020.1753069.

Reviews the use and social significance of translucent stone beads in the study area and provides the results of their chemical analysis.

Gaut, Bjarne

2011 Vessel Glass and Evidence of Glassworking. In *Things from the Town: Artefacts and Inhabitants in Viking-Age Kaupang,* edited by Dagfinn Skre, pp. 169-279. Kaupang Excavation Project Publication Series 3. Norske Oldfunn XXIV. https://www.duo.uio.no/handle/10852/44036.

Small-scale beadmaking took place at this market town in southern Norway during the first decade(s) of the 9th century. While no in situ workshop floors or furnaces have been preserved, the waste material indicates that glass beads were made from imported soda glass, blocks of raw glass, tesserae, and semi-manufactured rods.

Géza, Nagy, Pásztor Adrien, Fórizs István, and Tóth Mári

2010 Szarmata és avar kori üveggyöngyök elektron-mikroszondás vizsgálata [Investigation of Sarmatian and Avar Glass Beads by Electron Microprobe]. *Archeometriai Műhely* 2010/1:27-50; https://www.academia.edu/22482909/.

Nearly 200 glass beads found in Sarmatian (2nd-4th centuries AD) and Avar (6th-8th centuries AD) graves in Hungary were subjected to instrumental analysis. English abstract.

Ghervase, Luminiţa, Ioana Maria Cortea, Roxana Rădvan, and Corina Borş

2017 Non-Destructive Spectroscopic Investigation of Artefacts from Middle Hallstatt Period – Case Study of a Stone Bead from Tărtăria I Hoard, Romania. *Archaeological and Anthropological Sciences* https://doi.org/10.1007/s12520-017-0502-9.

The highly heterogenous bead, found together with numerous bronze and iron objects, appeared to be a variety of chalcedony rich in iron and copper impurities, still preserving clay minerals from the sedimentary matrix in some of the areas.

Gibson, Robert O. and Henry C. Koerper

2000 AMS Radiocarbon Dating of Shell Beads and Ornaments from CA-ORA-378. *Journal of California and Great Basin Anthropology* 22(2):342-352.

Accelerator mass spectrometry (AMS) dates for nine shell beads and two shell ornaments are used to test the application to Orange County of a temporal sequence developed for the Santa Barbara Channel region.

Giumlia-Mair, Alessandra

2011 Appendix B. Necklace No. 1: Evidence for Egyptian Influence in Mycenaean Jewelry Production. In *Mochlos IIC. Period IV. The Mycenaean Settlement and Cemetery: The Human Remains and Other Finds*, edited by Jeffrey S. Soles and Costis Davaras, pp. 167-172. INSTAP Academic Press, Philadelphia.

XRF analysis of some of the faience and gold beads comprising the necklace indicates an Egyptian origin for both the material and the production technique.

Giumlia-Mair, Alessandra, Philip P. Betancourt, Susan C. Ferrence, and James D. Muhly

2017 Special Silver Alloys from the Pre- and Proto-Palatial Cemetery of Petras, Crete. In *Petras, Siteia: The Pre- and Proto-Palatial Cemetery in Context. Acts of a Two-Day Conference Held at the Danish Institute at Athens, 14-15 February 2015*, edited by Metaxia Tsipopoulou, pp. 203-214. Monographs of the Danish Institute at Athens 21. https://www.academia.edu/52970441/.

Reports the results of XRF analyses of silver beads and pendants from an Early Minoan I - Middle Minoan IIA cemetery.

Giumlia-Mair, Alessandra, Susan C. Ferrence, Philip P. Betancourt, and James D. Muhly

2020 Silver and Silvery Alloys in Early Minoan IB Crete. *Materials and Manufacturing Processes* 35(13):1476-1483; https://www.academia.edu/52969243/.

Presents the results of X-ray fluorescence on silver beads, pendants, and other objects from three cemeteries dated to ca. 3000 to 2800 BC: Hagia Photia Siteias, Kephala Petras, and Livari Skiadi.

Giumlia-Mair, Alessandra and Jeffrey Soles

2013 Egyptian Faience and Rose Gold at Mochlos, Crete. *Surface Engineering* 29(2):114-120.

A Mycenaean necklace found in a tomb at Mochlos, Crete, consists of faience beads and a central gold bead, and is dated to the LM IIIA period (ca. 1400-1300 BC). Analysis of the beads reveals a strong Egyptian technological influence.

Gliozzo, E., D.J. Mattingly, F. Cole, and G. Artioli

2014 In the Footsteps of Pliny: Tracing the Sources of Garamantian Carnelian from Fazzan, South-West Libya. *Journal of Archaeological Science* 52:218-241.

Fragments of chert, carnelian, and amazonite found at the two sites in the Fazzan region and identified as raw materials associated with beadmaking were analyzed using LA-ICP-MS combined with mineralogical data obtained by X-ray powder diffraction and Raman spectroscopy.

Glover, I.C. and J. Henderson

1995 Early Glass in South and Southeast Asia and China. In *China and Southeast Asia: Art, Commerce and Interaction,* edited by R. Scott and J. Guy, pp. 141-169. Percival David Colloquies on Art and Archaeology in Asia 17.

Includes new analyses and argues, inter alia, for an early tradition of making high-potassium glass in Southeast Asia and/or southern China.

Glover, Lauren and J.M. Kenoyer

2019 Overlooked Imports: Carnelian Beads in the Korean Peninsula. *Asian Perspectives* 58(1):180-201.

Analyses of a sample of 68 carnelian and agate beads from Korea's late Proto-Three Kingdoms and Three Kingdoms period (C.E. 100-668) provide evidence for long distance exchange with South Asia. Three Kingdoms period elites were rejecting locally made stone beads made of local materials for stone beads obtained from long distance trade and made of non-local materials.

Gonçalves, A.P., Luís Cerqueira Alves, António M. Monge Soares, and José M. de Matos Martins

2010 As "contas de colar" dos Ratinhos – II. Identificação duma conta preta de aspecto vítreo. Métodos instrumentais de análise na desconstrução de uma inferência arqueológica. In *O Castro dos Ratinhos (Barragem do Alqueva, Moura). Escavaçoes num povoado proto-histórico do Guadiana, 2004-2007*, by L. Berrocal-Rangel and A.C. Silva, pp. 393-396. O Arqueólogo Português, Suplemento 6. https://www.academia.edu/2626834/.

A black bead initially believed to be made of glass was identified as stone. This raises the question whether other black beads from the proto-historical period that are identified as glass are in fact made of that substance.

Gonçalves, A.P. and A.M. Monge Soares

2010 As "contas de colar" dos Ratinhos – I. As contas em pedra análise por Difracçao de Raios X. In *O Castro dos Ratinhos (Barragem do Alqueva, Moura). Escavaçoes num povoado proto-histórico do Guadiana, 2004-2007*, by L. Berrocal-Rangel and A.C. Silva, pp. 389-392. O Arqueólogo Português, Suplemento 6. https://www.academia.edu/2626834/.

X-ray diffraction analysis of stone necklace beads from a proto-historical village in southern Portugal identifies them as carnelian.

Gonçalves, A.P., A.M. Monge Soares, Maria José Oliveira, Luis Cerqueira Alves, Pedro Valério, and João Luís Cardoso

2012 Caracterização de uma conta de vidro proveniente do povoado fortificado calcolíico da Moita da Ladra (Vila Franca de Xira) [Characterization of a Glass Bead from the Chalcolithic Fortified Settlement of Moita da Ladra (Vila Franca de Xira)]. *Estudos Arqueológicos de Oeiras* 19:291-300.

A bead recorded as being from a Chalcolithic context was found to be glass and consequently must be ascribed to the Late Bronze Age occupation recorded nearby and resulting from the early Phoenician trade.

Gonçalves, A.P., A.M. Monge Soares, A.C. Silva, and L. Berrocal-Rangel

2011 Stone Beads from Late Bronze Age and Early Iron Age Settlements from South-Western Portugal: Analyses by X-Ray Diffraction. In *Proceedings of the 37th International Symposium on Archaeometry, 13th-16th May 2008, Siena, Italy*, edited by Isabella Turbanti-Memmi, pp. 227-231. Springer. https://www.academia.edu/24798623/.

Gonçalves, A.P., P. Valério, A.M.M. Soares, and M.F. Araújo

2005 A Stone Bead from a SW Bronze Age Burial: Analysis by EDXRF and X-Ray Diffraction. *O Arqueólogo Português* IV(23):257-264.

Portugal.

Gradmann, Rena, Marianne Hasenmayer, Christoph Berthold, and Ulrich Schüssler

2013 Funde von Chevronperlen in den frühneuzeitlichen Glashütten Neulautern und Walkersbach im Schwäbisch-Fränkischen Wald. In *Archäometrie und Denkmalpflege: Jahrestagung an der Bauhaus Universität Weimar, 25.-28. September 2013,* edited by A. Hauptman, O. Mecking, and M. Prange, pp. 289-293. Deutsches Bergbau-Museum, Bochum. https://www.academia.edu/22952298/.

Investigates the probable origin of seven-layer chevron bead production canes and beads as well as blue canes with round and square sections likely dating to the 16th century found at two glassworks in the Heilbronn district of southwestern Germany.

Gratuze, Bernard

1999 Étude des perles protohistoriques en verre de l'inhumation de Marmilhat (Lempdes 63). IRAMAT (Institut de Recherche sur les ArchéoMATériaux), Centre E. Babelon, Orléans.

A study of the glass beads associated with a Protohistoric burial at Marmilhat, France.

2000 Étude des perles protohistoriques en verre des dolmens de la Planaise de Sampzon (07) conservées au Museum d'Histoire Naturelle de Lyon. IRAMAT (Institut de Recherche sur les ArchéoMATériaux), Centre E. Babelon, Orléans.

A study of the Protohistoric glass beads from the dolmens at Planaise Sampzon (07) and held by the Museum of Natural History, Lyon, France.

2001 Étude des perles protohistoriques en verre de tumulus de Mons (Saint Georges, 15). IRAMAT (Institut de Recherche sur les ArchéoMATériaux), Centre E. Babelon, Orléans.

A study of the Protohistoric glass beads found in the tumulus of Mons, France.

2001 Étude des perles protohistoriques en verre des dolmens d'Eyne – les Pascarets et la Borda – et d'Enveitg – Bragnoli (Pyrenees Orientales). IRAMAT (Institut de Recherche sur les ArchéoMATériaux), Centre E. Babelon, Orléans.

A study of the Protohistoric glass beads found in the dolmens at Eyne and Bragnoli, Eastern Pyrenees, France.

2001 Étude de perles en verre provenant de la sépulture de Haute-Grève (Gouaix, 77). In Gouaix "La Haute Grève" Nécropole du Bronze final. Archaeological assessment report. Programme d'interventions archéologiques dans les carrières de la Bassée.

A study of the glass beads from the sepulture at Haute-Grève, France.

2003 Étude des perles en verre et en faïence de l'Age du Bronze. In *Fouille archéologique de la Grande Rivoire à Sassenage (Isère): Rapport de fouille 2000-2003*, edited by Pierre-Yves Nicod, Régis Picavet, and Cyril Bernard, pp. 233-242. Département d'anthropologie et d'écologie de l'Université de Genève, Conseil Général de l'Isère, Genève and Grenoble.

A study of Bronze Age beads of glass and faience.

2004 Étude des perles protohistoriques en verre du tumulus de Courtesoult (Haute-Saône). Internal Analytical Report. IRAMAT (Institut de Recherche sur les ArchéoMATériaux), Centre E. Babelon, Orléans.

A study of the Protohistoric glass beads found in the tumulus at Courtesoult, France.

2005 Étude des perles protohistoriques en verre du Puech des Mus (Sainte-Eulalie-de-Cernon, Aveyron). IRAMAT (Institut de Recherche sur les ArchéoMATériaux), Centre E. Babelon, Orléans.

A study of the Protohistoric glass beads from Puech des Mus, France.

2013 Glass Characterisation Using Laser Ablation Inductively Coupled Plasma Mass Spectrometry Methods. In *Modern Methods for Analysing Archaeological and Historical Glass, Vol. I.*, edited by Koen Janssens, pp. 201-234. Wiley Online Library.

Objects studied include polychrome and gold- and silver-foil beads.

2013 Provenance Analysis of Glass Artefacts. In *Modern Methods for Analysing Archaeological and Historical Glass, Vol. I.*, edited by Koen Janssens, pp. 311-343. Wiley Online Library.

Glass trade beads.

2017 Glass Characterization Using Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry Methods. In *Recent Advances in Laser Ablation ICP-MS for Archaeology,* edited by Laure Dussubieux, Mark Golitko, and Bernard Gratuze, pp. 179-196. Springer, Berlin.

The accurate determination of archaeological glass sample composition is challenging due to possible heterogeneity and post-production chemical alteration. Here, depth profiling using the time resolved signal generated by LA-ICP-MS (DP-LA-ICP-MS) is applied to two case studies. The first concerns corroded Late Bronze Age glass beads. While many varieties of ancient glass beads are corrosion resistant, some recipes are particularly impacted by devitrification, and depth profiling allows for analysis of un-corroded material reflecting original glass composition.

Gratuze, Bernard and Y. Billaud

1998 Analyses chimiques de perles en verre de l'âge du Bronze final en domaine Rhodano-Alpin. *Bulletin de liaison de la Société Française de Minéralogie et de Cristallographie* 10(1):5-6.

On the chemical analysis of Late Bronze Age glass beads from the Rhône-Alpes region of France.

2003 La circulation des perles en verre dans le Bassin Méditerranéen de l'Age du Bronze moyen jusqu'au Hallstatt. In *Echanges et commerce du verre dans le monde antique. Actes du colloque de l'AFAV, Aix-en-Provence Marseille 7-9 juin 2001*, edited by D. Foy and M.D. Nenna, pp. 11-15. Monographie Instrumentum 24.

The circulation of glass beads in the Mediterranean Basin from the Bronze Age to the Hallstatt period.

2014 Inventaire des perles en verre et en faïence de l'Age du Bronze originaires des ateliers de la région de Frattesina retrouvées en France. In *Il vetro in età protostorica in Italia: Atti delle XVI Giornate Nazionali di Studio sul Vetro, Adria (RO), Museo Archeologico Nazionale, 12-13 maggio 2012,* edited by Silvia Ciappi, Annamaria Larese, and Marina Uboldi, pp. 25-37. Association Internationale pour l'Histoire du Verre – Comitato Nazionale Italiano, Venice. https://www.researchgate.net/publication/269335283.

Presents an inventory of the Bronze Age glass and faience beads originating from the workshops of the Frattesina region in France. Includes the results of LA-ICP-MS analysis.

Gratuze, Bernard and P. Cosyns

2007 La composition chimique des perles en verre de la tombe à char de la nécropole laténienne de Neufchâteau-Le Sart par LA-ICP-MS. *Arduinna* 63:1-7.

The chemical composition of glass beads from a LaTène necropolis in France using LA-ICP-MS.

Gratuze, Bernard and Laure Dussubieux

2001 Analyse de quatre perles en verre trouvées à Ban Wang Hai. In *Ban Wang Hai, un cimetière de l'âge du Fer en Thaïlande du Nord,* edited by J.-P. Pautreau, P. Mornais, and T. Doy-Asa, pp. 47-48. Silkworms Books, Chiang Mai, Thailand.

Reports on the analysis of glass beads from an Iron Age site in northern Thailand.

Gratuze, Bernard, L. Dussubieux, and O. Bopearachchi

2000 Étude de perles de verre trouvées au Sri Lanka, IIIe s. av. - IIe s. ap. JC. *Annales du 14e Congrès de l'Association Internationale pour l'Histoire du Verre, Venezia/Milano 1998,* pp. 46-50.

A study of glass beads found in Sri Lanka which date from the 3rd century BC to the 2nd century AD.

Gratuze, Bernard, L. Dussubieux, J. Cesari, P. Nebbia, J. Magdeleine, A. Pasquet, J.-C. Ottaviani, and Y. Billaud

2007 La circulation des objets de parure en verre dans le Bassin Méditerranéen au cours de la Protohistoire. In *Corse et Sardaigne préhistoriques – relations et échanges dans le contexte méditerranéen: Actes du 128e Congrès national des Sociétés savantes, Bastia 2003,* edited by André D'Anna, Joseph Cesari, Laurence Ogel, and Jean Vaquer, pp. 359-369.

On the movement of glass ornaments in the Mediterranean Basin during the Protohistoric period with emphasis on the origin of beads found at Bronze and Iron age sites on Corsica, Italy.

Gratuze, Bernard and Koen Janssens

2004 Provenance Analysis of Glass Artefacts. In *Non-Destructive Micro Analysis of Cultural Heritage Materials*, edited by K. Janssens and R. Van Grieken, pp. 663-712. Elsevier B.V., Amsterdam.

Describes a number of different case studies from various historical contexts and geographical areas to illustrate the manner in which the chemical analysis of historical glasses can provide information on trade and the provenance of glass artifacts (including beads) in different historic periods.

Gratuze, Bernard, Marie-Pierre Koenig, Suzanne Plouin, and Jean-Michel Treffort

2013 Les perles en faïence et en verre de l'âge du Bronze: contextes archéologiques et analyses pour l'Alsace et la Lorraine. *Cahiers alsaciens d'archéologie d'art et d'histoire* LVI:21-52.

On the archaeological contexts and analysis of Bronze Age faience and glass beads from Alsace and Lorraine, France.

Gratuze, Bernard and Françoise Lorenzi

2006 Les éléments de parure en verre du site de Lumaca (Âge du Fer, Centuri, Haute-Corse): compositions et typochronologie. *Bulletin de la Société préhistorique française* 103(2):379-384.

Occupied from the Early Neolithic until modern times, the settlement at Lumaca, Upper Corsica, France, produced eight glass beads. Analyses reveal that they were all manufactured with Near-Eastern soda glass and likely date to the Iron Age.

Gratuze, Bernard, C. Louboutin, and Y. Billaud

1998 Les perles protohistoriques en verre du musée des Antiquités nationales. *Antiquités nationales* 30:11-24.

Protohistoric glass beads at the National Archaeological Museum, France.

Gratuze, Bernard, Inès Pactat, and Nadine Schibille

2018 Changes in the Signature of Cobalt Colorants in Late Antique and Early Islamic Glass Production. *Minerals* 8(6); https://doi.org/10.3390/min8060225

Aims to characterize the chemical composition of cobalt colorants used during the 1st millennium C.E. Compositional variations indicate the use of different raw materials and/or production processes, which in turn has implications for the underlying exchange networks. Merovingian and Viking glass beads are included in the analysis.

Gratuze, Bernard, Constantin Pion, and Torben Sode

2021 Indian Glass Beads in Western and North Europe in Early Middle Age. In *Ancient Glass of South Asia: Archaeology, Ethnography and Global Connections*, edited by Alok Kumar Kanungo and Laure Dussubieux, pp. 427-450. Springer Nature, Singapore.

Chemical analyses of glass beads recovered from late Antique and Early Middle Age sites in western and northwestern Europe have revealed the presence of two groups of glass beads with unexpected compositions for these periods and geographic areas which exhibit several similarities with South Asian glasses.

Gratuze, Bernard, J.N. Soulier, and J.N. Barrandon

1997 L'analyse chimique, un outil au service de l'histoire du verre; la Seube, une verrerie du Sud de la France au XIVe siècle: fabrication locale et importation. *Verre* 3(1):37-40, 42-43.

This study of the glass beads from a 14th-century glass works in southern France demonstrates the usefulness of the chemical analysis of glass to show the relationship between the chemical composition of glasses and the chronology of objects, glass trade, and glass recipes. It also indicates that fast neutron analysis using a cyclotron and laser ablation ICMS complement each other. La Seube was remarkable for its variety of glass, including beads.

Gregerová, M., M. Hložek, and P. Sulovský

2006 Přirodovědné analýzy fajánsového korálku z hrobu nitranské kultury ze Slatinic, okres Olomouc [Die naturwissenschaftlichen Analysen der Fayenceperle aus dem Grab der Nitraer Kultur aus Slatinice, Bezirk Olomouc]. *Slovenská Archeológia* LIV(1):33-40.

Presents the results of analyses of a faience bead found in an Early Bronze Age woman's grave of the Nitra Culture near Slatinice, Czech Republic. The results point to Egyptian import, not local manufacture.

Gregor, Miloš, Ľubomír Vančo, Magdaléna Kadlečíková, and Juraj Breza

2013 Raman Spectroscopy of Gemstones on the Necklaces from Ancient Graves at the Castle of Devín. In *Proceedings of the 19th International Conference on Applied Physics of Condensed Matter (APCOM 2013), June 19-21, 2013, Štrbské Pleso, Slovak Republic,* edited by J. Vajda and I. Jamnický, pp. 42-45.

Stone beads from two necklaces found in ancient graves attributed to the 11th-12th centuries in Slovakia were subjected to Raman and X-ray analyses.

Greiff, Susanne

2010 Analyses of Some Ancient Cambodian Glass Finds from Krek Village 10.8. In *Glass along the Silk Road from 200 BC to 1000 AD*, edited by Bettina Zorn and Alexandra Hilgner, pp. 153-162. Tagungen des Römisch-Germanischen Zentralmuseums 9.

Reports on the analysis of four blue glass beads.

Greiff, Susanne and A. Banerjee

1993 Mineralogische Untersuchungen am Amulett der Ötztaler Gletscherleiche mit Hilfe der Diffusen IR-Reflexionsspektroskopie. *Archäologisches Korrespondenzblatt* 24(3):461-467.

Describes the non-destructive method used to analyze the bead of Italian dolomite found with the mummified Chalcolithic Ice Man in the Ötztal Alps between Austria and Italy. Chemical analysis might pin down the source more exactly.

Greiner-Wronowa, Elżbieta, Dominika Zabiegaj, and Paolo Piccard

2013 Glass-Metal Objects from Archaeological Excavation: Corrosion Study. *Applied Physics A* 113(4):999-1008.

Contributes to the investigations on history, technology, and degradation of Middle Age objects (metallic rings with mounted glass beads) recently excavated under the Main Square in Krakow, Poland.

Groza, Randall G.

2002 An AMS Chronology for Central California *Olivella* Shell Beads. M.A. thesis. San Francisco State University.

Groza, Randall G., Jeffrey S. Rosenthal, John Southon, and Randall T. Milliken

2011 A Refined Shell Bead Chronology for Late Holocene Central California. *Journal of California and Great Basin Anthropology* 31:135-154.

Based on the direct accelerator mass spectrometry (AMS) dating of 140 stylistically distinct *Olivella* shell beads, this report presents a refined late Holocene cultural chronology for central California that replaces Bennyhoff and Hughes' Scheme B.

Gruber, Christian, Sophie Hüdepohl, and Martin Mach

2019 Korallenperlen aus den spätrömischen Gräberfeldern von *Guntia*/Günzburg und ihre archäometrische Analyse mittels Raman-Spektrometrie. *Berichte der bayerischen Bodendenkmalpflege* 60:129-147; https://www.academia.edu/42978436/.

Discusses the archaeometric analysis of coral beads from Late Roman graves at *Guntia* (Günzburg in southern Germany).

Gu, Zhou, J.M. Kenoyer, and Yimin Yang

2016 Investigation of Ancient Harappan Faience Through LA-ICP-AES and SR-μ CT. *Journal of Instrumentation* 11:n.p.

Analysis confirms that the production of Harappan faience beads utilized the efflorescence glazing method.

Gu, Zhou, Wugan Luo, Xiaochenyang Jiang, Nian Liu, Yanan Fu, Lili Zhang, Min Yang, and Yimin Yang

2020 Copper-Red Glass Beads of the Han Dynasty Excavated in Yunnan Province, Southwestern China. *Journal of Glass Studies* 62:11-22; https://www.jstor.org/stable/26951070.

Five tiny opaque red beads found in Muyi Cemetery were analyzed to determine their production technology and to explore their possible provenance. Chemical analysis revealed they are composed of potash glass with higher CaO and Al_2O_2.

Gu, Zhou, Jian Zhu, Yaoting Xie, Tiqiao Xiao, Yimin Yang, and Changsui Wang

2014 Nondestructive Analysis of Faience Beads from the Western Zhou Dynasty, Excavated from Peng State Cemetery, Shanxi Province, China. *Journal of Analytical Atomic Spectrometry* 29:1438-1443.

The beads could be divided into two types: glazed faience and glassy faience. It is inferred that these beads were first formed on an organic cylinder and then glazed using the direct application method. They appear to have an indigenous origin in China.

Guerra, M.F.

2000 A Report on the Composition of a Gold Bead from Gao (GAD 96 A 13). In *Urbanism, Archaeology and Trade: Further Observations on the Gao Region (Mali), The 1996 Fieldseason Results*, edited by T. Insoll, pp. 153-155. British Archaeological Reports, International Series 829.

Guilaine, J., B. Gratuze, and J.N. Barrandon

1991 Les perles de verre du chalcolithique et de l'âge du bronze. Analyses d'exemplaires trouvés en France. In *L'Age du Bronze Atlantique, Actes du 1er Colloque du parc Archéologique de Beynac, 10-14 sept. 1990,* edited by C. Chevillot and A. Coffyn, pp. 255-266. Association des musées du Sarladais, Beynac, and Cazenac.

Analysis of glass beads of the Chalcolithic and Bronze Age found in France.

Guilaine, Jean, Guirec Querré, Serge Cours, Jacques Coularou, Hélène Vergély, Jean Vaquer, and Muriel Gandelin

2023 The Variscite «Necklace» of the Salpêtre Cave, at Pompignan (Gard, France). *Journal of Archaeological Science: Reports* 47, 103768; https://doi.org/10.1016/j.jasrep.2022.103768.

A set of 17 variscite beads excavated in a cave in southeastern France constitutes a unique Middle Neolithic ornament. PIXE (Particle Induced X-ray Emission) chemical analysis of the beads and reference samples from possible sources indicates a mineral origin from the Gava mines situated near Barcelona, Spain.

Gupta, Sunil

2000 New Analyses of Indo-Pacific Beads and Glass Waste from Arikamedu, India. *Bead Study Trust Newsletter* 35:8-9; https://www.societyofjewelleryhistorians.ac.uk/bead_study_trust.

Presents chemical composition data on twelve micro-bead and waste-glass samples surface collected at Arikamedu in southeastern India.

Hadden, Carla S., Alexander Cherkinsky, Geoffrey M. Smith, Aaron P. Ollivier, and Hai Pan

2017 Carbon and Oxygen Isotope Composition of Early Holocene *Olivella* Shell Beads from the Northwest Coast, USA. *Radiocarbon* 2017:1-13; https://www.academia.edu/34601197/.

Expands upon and re-examines the incremental carbon (^{14}C and $\delta^{13}C$) and oxygen ($\delta^{18}O$) isotope data from two shell beads from the LSP-1 Rockshelter, Oregon, to address two common problems in dating marine shell trade goods: 1) the source region is large, adding to uncertainty regarding the appropriate specification of ΔR, and 2) the ^{14}C activity within individual specimens is variable.

Hall, Mark E. and Leonid Yablonsky

1997 Chemical Analyses of Glass Beads found in Two Sarmatian Burials. *Archaeometry* 39:369-377.

The chemical compositions of 14 glass beads from two Early Sarmatian-period burials were determined. All the beads can be classed as low-magnesia soda-lime-silica glasses. The blue glass beads examined in this study were colored with Co and Cu containing minerals. Cluster analysis and principal-component analysis suggest that two distinct glass recipes were used to manufacture these beads.

1998 Chemical Analyses of Sarmatian Glass Beads from Pokrovka, Russia. *Journal of Archaeological Science* 25(12):1239-1245.

The chemical composition of 18 glass beads from Early Sarmatian period burials were determined using electron probe microbeam analysis and energy dispersive X-ray fluorescence. Multivariate analysis of the major oxides suggests that there are five distinct glass recipes. These indicate the involvement of the Sarmatians in exchange/trade networks linking the Eastern Mediterranean, the Indian subcontinent, and China.

Han, Min Su

2017 Characteristic Analysis of Chemical Compositions for Ancient Glasses Excavated from the Sarira Hole of Mireuksaji Stone Pagoda, Iksan. *Journal of Archaeological Science* 33(3):215-223; https://doi.org/10.12654/JCS.2017.33.3.06.

Chemical analysis of 11 glass beads recovered from a site in Korea reveal that they represent a soda-glass group with high contents of SiO_2 and Na_2O; this can be further subdivided into soda-alumina groups (Na_2O-Al_2O_3-CaO-SiO_2).

Han, Min Su, Han Hyoung Lee, and Eun Jung Moon

2011 Characteristics of Chemical Compositions and Weathering of Glass Beads Excavated from Andong Tumulus in Gildu-ri, Goheung. *Journal of Conservation Science* 27(3):323-332; https://www.e-jcs.org/m/journal/view.php?number=409.

Excavated in the southwest region of the Korean Peninsula, the beads date to the 4th-5th centuries. In Korean with English abstract.

Hancock, R.G.V.

2005 Elemental Analyses of North American Glass Trade Beads. *Beads: Journal of the Society of Bead Researchers* 17:52-57; https://www.academia.edu/27509077/.

Provides a good description of neutron activation analysis and summarizes the findings to date.

2013 European Glass Trade Beads in Northeastern North America. In *Modern Methods for Analysing Archaeological and Historical Glass,* edited by Koen Janssens, pp. 459-471. Wiley Online Library. https://www.researchgate.net/publication/236650863.

Summarizes the chemical data for beads in the region and postulates origins.

Hancock, R.G.V., S. Aufreiter, and I. Kenyon

1996 Preliminary Chemical Survey of White Glass Beads from the Rochester Museum and Science Center. https://www.academia.edu/25807191/.

Eighty beads were analyzed to obtain maximum diversity of bead forms and to blanket the period 1650-1690 in order to determine the earliest occurrence of Sb-rich white glass beads.

1997 European White Glass Trade Beads as Chronological and Trade Markers. In *Materials Issues in Art and Archaeology V,* edited by P.B. Vandiver et al., pp. 181-191. Materials Research Society, Symposium Proceedings 462. https://www.academia.edu/13922142/.

The opacifiers in the glass used to manufacture white trade beads from the early 17th to 20th centuries changed through time, making it potentially possible to date otherwise nondescript "seed" beads by means of nondestructive chemical analysis.

Hancock, R.G.V., S. Aufreiter, I. Kenyon, and M. Latta

1999 White Glass Beads from the Auger Site, Southern Ontario, Canada. *Journal of Archaeological Science* 26(8):907-912.

A sample of 94 glass beads from the early 17th century was analyzed by instrumental neutron activation. Four different glass chemistries were found, some shape specific. The beads are tin rich.

Hancock, R.G.V., S. Aufreiter, J.-F. Moreau, and I. Kenyon

1996 Chemical Chronology of Turquoise Blue Glass Trade Beads from the Lac-Saint-Jean Region of Quebec. In *Archaeological Chemistry: Organic, Inorganic, and Biochemical Analysis*, edited by Mary Virginia Orna, pp. 23-36. American Chemical Society Symposium Series 625.

Reports on instrumental neutron activation analysis of 80 beads from 3 sites. Comparison with the composition of well-dated beads from elsewhere now helps to date these sites.

Hancock, R.G.V., A. Chafe, and I. Kenyon

1994 Neutron Activation Analysis of Sixteenth and Seventeenth Century European Blue Glass Beads from the Eastern Great Lakes Area of North America. *Archaeometry* 36(2):253-266; https://www.academia.edu/13915294/.

Reports the results of the analysis of both cobalt- and copper-colored beads. There seem to be chemical differences between the copper-colored specimens of the 16th century and those of the 17th century.

Hancock, R.G.V. and Elizabeth Graham

2006 Evidence for the Period of Distribution of European Glass Beads at the Spanish Mission of Tipu in Belize. In *34th International Symposium on Archaeometry*, *3-7 May 2004, Zaragoza, Spain,* edited by Josefina Pérez-Arantegui, pp. 483-487. Institución Fernando el Católico, Zaragoza.

The findings are consistent with the proposal that most of the European goods were brought to Tipu during the active mission period that began in the mid-16th century and largely ended with the Belize Maya rebellion of 1638-1641.

Hancock, R.G.V., J. McKechnie, S. Aufreiter, K. Karklins, M. Kapches, M. Sempowski, J.-F. Moreau, and I. Kenyon

2000 The Non-Destructive Analysis of European Cobalt Blue Glass Trade Beads. *Journal of Radioanalytical and Nuclear Chemistry* 244:567-573; https://www.academia.edu/14217766/.

Chemical analyses were performed on royal blue glass trade beads from two early-17th-century archaeological sites in southern Ontario, Canada, and from a glass beadmaking house in Amsterdam, The Netherlands. The results confirm that these beads were all mixed alkali-lime-silica glasses, colored with Co and with opaque variants opacified with Sn.

Hancock, R.G.V., L.A. Pavlish, R.M. Farquhar, R. Salloum, W.A. Fox, and G.C. Wilson

1991 Distinguishing European Trade Copper and North-Eastern North American Native Copper. *Archaeometry* 33(1):69-86.

Neutron activation analysis of native copper samples from the Lake Michigan/Lake Superior region, European copper artifacts (including beads) from 16th-17th-centuries archaeological sites in Ontario, and modern copper wire reveals that the three groups can be distinguished on the basis of their composition.

Hao, Wentao, Yimin Yang, Jian Zhu, Zhou Gu, Yaoting Xie, Jing Zhang, and Lihua Wang

2014 XANES Investigation of Chinese Faience Excavated from Peng State Cemetery Site in Western Zhou Period (BC1046-BC771). *Journal of Electron Spectroscopy and Related Phenomena* 196:133-135.

Analysis of two faience beads of blue and green color, respectively, reveals that the coloring element in both beads is copper with +2 valence, and the color divergence of these two beads may originate from different local chemical environments of Cu2+. It is suggested that the faience in this period is the earliest glaze with copper colorant in China.

Harrison, Ainslie C., Kim Cullen Cobb, Harriet F. Beaubien, Paul Jett, and Julia Mayo

2012 A Study of Pre-Columbian Gold Beads from Panama. In *Historical Technology, Materials and Conservation: SEM and Microanalysis,* edited by Nigel Meeks, Caroline Cartwright, Andrew Meek, and Aude Mongiatti, pp. 49-55. Archetype Publications, London.

Hartmann, Gerald, Irene Kappel, Klaus Grote, and Betty Arndt

1997 Chemistry and Technology of Prehistoric Glass from Lower Saxony and Hesse. *Journal of Archaeological Science* 24(6):547-559.

The investigated collection of glass beads and bracelets represents a cross-section of the most important glass types found for the Bronze Age and Iron Age in Central Germany. Among the

artifacts are examples of different chemical compositions, colors, and varying degrees of opacity. The artifacts date from the 14th-1st centuries BC.

Hawkins, Alicia and Heather Walder

2022 Characterizing Glass Recipes for Distinctive Polychrome Glass Bead Types in Ontario, Canada. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 57-80. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.8.

Presents an analysis of Nueva Cadiz beads from Huron-Wendat sites in southern Ontario.

Heck, G.

1996 Anwendung der PY-GC auf die Herkunftsbestimmung von Bernstein. *Acta Praehistorica et Archaeologica* 28:154-165.

Describes and illustrates the pyrolysis-gas chromatography method of determining the provenance of amber.

Heck, Martin

2000 *Chemisch-Analytische Untersuchungen an frühmittelalterlichen Glasperlen.* Fachbereich Chemie, Technische Universität Darmstadt. <http://elib.tu-darmstadt.de/diss/000065>

Several different analytical methods were used to determine the chemistry and structure of ca. 1500 variously colored beads found in female tombs of the Merovingian (early medieval) period.

Heck, M. and P. Hoffmann

2000 Coloured Opaque Glass Beads of the Merovingians. *Archaeometry* 42(2):341-357; https://doi.org/10.1111/j.1475-4754.2000.tb00886.x.

Several analytical methods were used to throw light on glass technology during an important period of cultural transition.

2000 Rohstoffe für die Farbgebung merowingerzeitlicher Glasperlen. In *Archäometrie und Denkmalpflege: gemeinsame Jahrestagung des Arbeitskreises Archäometrie der GDCH und des Arbeitskreises Archäometrie u. Denkmalpflege der Deutschen Mineralog. Ges., Dresden 2000,* pp. 110-112.

On the raw materials for coloring Merovingian glass beads.

2002 Analysis of Early Medieval Glass Beads: The Raw Materials to Produce Green, Orange and Brown Colours. *Microchimica Acta* 139(1-4):71-76; https://doi.org/10.1007/s006040200042.

Analysis of monochrome Merovingian (5th-7th centuries) glass beads reveals that oxidized metals, alloys (lead, copper, bronze, brass, and mixtures of them), and iron smelting slag were used as raw materials to color the soda-lime glass.

Heck, M., P. Hoffmann, and H.M. Ortner

1999 Bestimmung der Zusammensetzung von inhomogenen, kleinen und unregelmäßig geformten altertümlichen Glasperlen mit Hilfe der Röntgenfluoreszenzanalyse. In *6. Anwendertreffen für Röntgenfluoreszenz- und Funkenemissionsspektrometrie, Dortmund 15.-16.3.1999,* pp. 168-176.

Reports on the use of X-ray fluorescence analysis to determine the composition of inhomogeneous, small, and irregularly shaped ancient glass beads.

Heck, M., P. Hoffmann, P. Streitwolf, C. Theune, and J. Callmer

1997 Charakterisierung gelber merowingerzeitlicher Glasperlen. In *Proceedings der Jahrestagung Archäometrie und Denkmalpflege, Wien, 24.-27.3.1997,* pp. 213-215.

Characterizes yellow Merovingian glass beads.

Heck, M., P. Hoffmann, C. Theune, and J. Callmer

1998 Archäometrische Untersuchungen an gelben und braunen merowingerzeitlichen Glasperlen. In *Proceedings der Jahrestagung Archäometrie und Denkmalpflege, Würzburg 23.-25.9.1998,* pp. 155-157.

On the archaeometrical study of yellow and brown Merovingian glass beads.

1998 Farbmessungen an merowingerzeitlichen Glasperlen. In *Proceedings der Jahrestagung Archäometrie und Denkmalpflege, Würzburg 23.-25.9.1998*, pp. 158-160.

Reports on the color characteristics of Merovingian glass beads.

Heckel, C., K. Müller, R. White, H. Floss, N.J. Conard, and I. Reiche

2014 Micro-PIXE/PIGE Analysis of Palaeolithic Mammoth Ivory: Potential Chemical Markers of Provenance and Relative Dating. *Palaeogeography, Palaeoclimatology, Palaeoecology* 416:133-141.

Reports on the analysis of mammoth ivory artifacts (beads included) from four Palaeolithic sites (Abri Castanet, Vogelherd Cave, and Grottes de la Verpillière I and II) in France and Germany in order to assess the effectiveness of this approach to material older than 30,000 y BP.

Heckel, C., K. Müller, R. White, S. Wolfe, N.J. Conard, C. Normand, H. Flosse, and I. Reiche

2015 F-Content Variation in Mammoth Ivory from Aurignacian Contexts: Preservation, Alteration, and Implications for Ivory-Procurement Strategies. *Quaternary International*; https://www.researchgate.net/publication/287974277.

Presents the results of two series of micro-PIXE/PIGE analysis on mammoth ivory samples (including beads and pendants) from four Aurignacian sites in France (Abri Castanet, Grotte d'sturitz) and Germany (Hohle Fels, Vogelherd).

Helmi, Fatma M. and Nagwa S. Abdel-Rehim

2016 Study of Color Conversion by Time in Ancient Egyptian Faience Artifacts. *Scientific Culture* 2(3):17-23.

Using various analytical processes, investigates why there is color change in ancient Egyptian artifacts, including beads (blue to pale green and red to nearly white).

Henderson, Julian

1984 Beads of Glass. In *Danebury: An Iron Age Hillfort in Hampshire*, edited by B. Omliffe, pp. 396-398 and Fiche 10, frames E4-F2. *CBA Research Report* 52.

Chemical analysis of the beads using X-ray fluorescence suggests that some Iron Age beads that look alike come from different glassworking centers. England, United Kingdom.

1987 Chemical and Archaeological Analysis of Some British and European Prehistoric Glasses. *Annales du 10^{e} Congres de l'Association Internationale pour l'Histoire du Verre, Madrid-Segovia 1985,* pp. 13-22. Amsterdam.

The study centers on beads of transparent blue and opaque yellow glass from 4th-1st-centuries-BC archaeological contexts in Britain. The beads are from Wetwang Slack, North Humberside, Meare, Somerset, and lump yellow glass from Hengistbury Head, Dorset, England, United Kingdom.

1987 The Iron Age of "Loughey" and Meare: Some Inferences from Glass Analysis. *The Antiquaries Journal* LXVIII:19-42.

The Meare and "Loughey" sites are discussed with specific reference to the recovered glass. Chemical analysis shows that beads of the same "type" can have entirely different chemical compositions, suggesting different sources. England, United Kingdom.

1988 Electron-Probe Microanalysis of Mixed-Alkali Glasses. *Archaeometry* 30(1):77-91.

Includes chemical analysis of glass beads from Bronze Age Rathgall, Co. Wicklow, Ireland. Discussion of why the compositions are quite different from contemporary Near Eastern glass.

1988 Glass Production and Bronze Age Europe. *Antiquity* 62(236):435-451; https://www.academia.edu/21545673/.

Provides the results of chemical analyses of European Bronze Age glasses, including beads. One color plate.

1989 The Scientific Analysis of Ancient Glass, and its Archaeological Interpretation. In *Scientific Analysis in Archaeology, and its Interpretation,* edited by J. Henderson, pp. 30-58. University of Oxford Committee for Archaeology Monograph 19. University of California at Los Angeles, Institute of Archaeology, Archaeological Research Tools 5.

Reviews glass analysis, glass technology, and the chemical characterization of glass and beads.

1990 The Scientific Investigation of the Glass Beads from Apple Down Anglo-Saxon Cemetery and its Archaeological Interpretation. Chichester District Council, *Chichester Excavations* 7:156-168,

Presents descriptions of the beads, with electron microprobe analyses. England, United Kingdom.

1991 The Chemical Analysis of Glass Beads from Burton Fleming and Rudston. In *Iron Age Cemeteries in East Yorkshire,* by I.M. Stead, pp. 167-169. English Heritage Archaeological Report 22.

Chemical analyses of Iron Age glass beads, England, United Kingdom.

1993 Chemical Analysis of the Glass and Faience from Hauterive-Champréveyres, Lake Neuchâtel, Switzerland. In *Metal et parure au Bronze final, Hauterive-Champréyres*, Vol. 9, edited by Anne-Marie Rychner-Faraggi, pp. 111-118. Musée cantonal d'archéologie, Neuchatel.

Mixed-alkali glass beads from a Bronze Age Swiss lake village.

1993 The Scientific Analysis of Vitreous Materials from Kestria and Theologos-Tsiganadika Tombs. In *Proto-Historic Thasos,* by C. Kowkouli-Chrysanthaki. Athens.

Very unusual Late Bronze Age and Early Iron Age glass bead compositions, Greece.

1995 A Reconsideration of the Glass: Some Archaeological and Technological Aspects. In *Industrious and Fairly Civilised,* by J. Coles and S. Minnitt, pp. 155-160. Somerset Levels Project and Somerset County Council Museums Service.

Important, mainly Late Iron Age Site in southern England, United Kingdom. Chemical analyses provide supporting evidence for a Late Iron Age glass bead technology.

1995 The Scientific Analysis of Glass Beads. In *Glass Beads: Cultural History, Technology, Experiment and Analogy,* edited by M. Rasmussen, U.L. Hansen, and U. Näsman, pp. 67-75. Historical-Archaeological Experimental Center, Studies in Technology and Culture 2.

2013 *Ancient Glass: An Interdisciplinary Exploration.* Cambridge University Press, Cambridge.

Provides an in-depth consideration of glass as a material, the raw materials used to make it, and its wide range of chemical compositions in both the East and the West from its invention to the 17th century AD. Highly recommended.

Henderson, Julian, J. An, and H. Ma

2018 The Archaeometry and Archaeology of Ancient Chinese Glass: A Review. *Archaeometry* 60(1):88-104; https://www.academia.edu/37536377/.

This paper provides a new review of archaeometric research carried out on glass found in China, set in an archaeological context, from its earliest occurrence to the Song dynasty. It discusses

chemical and isotopic compositional contrasts in glasses from different periods found in different parts of China, the glasses that were almost certainly made in China and those that were imported.

Henderson, Julian and J. Callmer

1991 Glassworking at Åhus, S. Sweden (eighth century AD). *Laborativ Arkeologi* 5:143-154.

Discussion of the chemical analyses of raw materials, glass beads, etc.

Henderson, Julian, Simon Chenery, Kimiyoshi Matsumuraki, Jane Evans, and Sachihiro Omura

2021 Did the Hittites Make Glass? *Annales du 21^{e} Congrès de l'Association Internationale pour l'Histoire du Verre,* İstanbul, pp. 27-31; https://www.researchgate.net/publication/357805976.

Provides one of the first scientific investigations of Hittite glass beads from Kaman Kalehöyük, dating mainly to phase IIIB (1650 and 1400 BCE), and a pendant from Büklükale, dating to the 16th century BC. Both sites are in central Anatolia.

Henderson, Julian, S. Chenery, S. Omura, K. Matsumura, and E. Faber

2018 Hittite and Early Iron Age Glass from Kaman-Kalehöyük and Büklükale, Turkey: Evidence for Local Production and Continuity? *Anatolian Archaeological Studies* XXI:70-84; https://www.academia.edu/36631889/.

Presents the first global results from electron probe microanalysis of glass beads found in Hittite and early Iron Age contexts from sites in central Anatolia, performed in order to determine if they were made in Turkey or not.

Henderson, Julian and I. Holand

1992 The Glass from Borg, an Early Medieval Chieftain's Farm in Northern Norway. *Medieval Archaeology* 36:29-58.

Presents an analysis of the beads and glass sherds recovered from a 1st millennium site.

Henderson, Julian and R. Ivens

1992 Dunmisk and Glass-Making in Early Christian Ireland. *Antiquity* 66 (250):52-64.

Reports evidence for glass working and the modification of raw glass by adding colorants. Finds include glass strands used for decorating beads, malformed beads, and crucible fragments with glass adhering.

Henderson, Julian, Torben Sode, and Yvette Sablerolles

2019 Early Medieval Tesserae from Scandinavia and the Netherlands: A Case for Recycling. In *Early Medieval Tesserae in Northwestern Europe,* edited by L. Van Wersch, L. Verslype, D. Strivay, F. Theuws, pp. 68-95. Merovingian Archaeology in the Low Countries 6.

Considers the possibility of the use of tesserae for glass bead production in Scandinavia and the Netherlands during the 8th-9th centuries, from both archaeological and compositional points of view.

Henderson, Julian and S.E. Warren

1986 Analysis of the Glass and Glassy Waste. In *Finds from Parliament Street and Other Sites in the City Centre*, by D. Tweddle, pp. 224-226. The Archaeology of York: The Small Finds 17/14. Council for British Archaeology, York.

On glass beads of the 12th and early 13th centuries AD excavated in the Shambles, York, England, United Kingdom.

Herzog, A. and J.-F. Moreau

2006 European Glass Trade Beads, Neutron Activation Analysis and the Historical Implications of Dating Seasonal Basque Whaling Stations in the New World. In *34th International Symposium on Archaeometry, Zaragoza, 3-7 May 2004*, edited by J. Pérez-Arantegui, pp. 495-502. Institución Fernando el Católico, Zaragoza.

Analyzes the beads recovered from a Basque settlement on Petit Mécatina Island, off the Lower North Shore of Quebec. The site is assigned to the period ca. 1675-1750.

Heyworth, Michael P.

1987 Examination and Analysis of Glass Beads from Wakerley. English Heritage, Ancient Monuments Laboratory Report 241/87.

1988 Examination and Analysis of Glass Beads from Beckford, Worcestershire. English Heritage, Ancient Monuments Laboratory Report 139/88.

A selection of glass beads from a Pagan Saxon cemetery were qualitatively analyzed to determine their composition. England, United Kingdom.

1988 Examination and Analysis of Glass Beads from Great Chesterford, Essex. English Heritage, Ancient Monuments Laboratory Report 137/88.

A selection of glass beads from a Pagan Saxon cemetery were qualitatively analyzed to determine the colorants and decolorants used. England, United Kingdom.

1988 Examination and Analysis of Glass Beads from Mucking, Essex. English Heritage, Ancient Monuments Laboratory Report 122/88.

1990 Examination and Analysis of Glass Beads from Empingham, Leicestershire. English Heritage, Ancient Monuments Laboratory Report 120/90.

A group of 65 glass beads from a Pagan Saxon cemetery were qualitatively analyzed to identify the colorants and decolorants used. England, United Kingdom.

1990 Examination of a Glass Bead from Winchester, Hampshire. English Heritage, Ancient Monuments Laboratory Report 6/90.

A bead fragment of colorless glass from a late medieval context contained small fragments of colored glass and millefiori. It appears to be in the Venetian style and to date from the 16th century. Colorants were identified by qualitative analysis. England, United Kingdom.

Hložeka, Martin

2013 Chemická analýza vybraných halštatských korálků pomocí SEM-EDX. *In* Skleněné korálky doby bronzové a halštatské na Moravě [Glass Beads from the Bronze Age and Hallstatt Period in Moravia], by Michaela Kršová, pp. 283-286. B.A. thesis. Department of Archaeology and Museology, Masaryk University, Brno, Czechia. https://theses.cz/id/p4dmjf/?lang=en.

Reports on SEM-EDX chemical analysis of selected Hallstatt beads recovered from sites in Moravia.

2013 Rentgen-fluorescenční analýzy skleněných korálků z halštatského období na Moravě. *In* Skleněné korálky doby bronzové a halštatské na Moravě, by Michaela Kršová, pp. 259-282. B.A. thesis. Department of Archaeology and Museology, Masaryk University, Brno, Czech Republic. https://theses.cz/id/p4dmjf/?lang=en.

Reports on the XRF analysis of Hallstatt glass beads recovered from sites in Moravia.

Hložeka, M. and T. Trojek

2015 Millefiori Glasswork Technique in the Migration Period: Investigation of Beads with the Use of Nondestructive X-Ray Fluorescence Micro-Analysis. *Radiation Physics and Chemistry* 116:332-334; DOI:10.1016/j.radphyschem.2015.01.020.

Non-destructive X-ray fluorescence micro-analysis was used to describe the elemental composition and the production technology of a unique millefiori bead that was found in a burial ground in Kyjov (Hodonin district, Czech Republic) dating back to the Migration Period.

Hoard, Robert J.

2012 Turquoise. In *Archeological Investigations at Arkansas City, Kansas*, edited by Robert J. Hoard, pp. 239-245. Kansas Historical Society, Contract Archeology Publication 26.

Discusses the prehistoric use of turquoise in the study area and provides the results of neutron activation analysis of turquoise from more than 40 source areas and 28 archeological sites. Beads are included in the study. Calibrated ^{14}C dates for features associated with the turquoise are also provided.

Hoffmann, Peter

1994 Analytical Determination of Colouring Elements and of their Compounds in Glass Beads from Graveyards of the Merowings Time. *Fresenius' Journal of Analytical Chemistry* 349(4):320-333.

Monochrome beads excavated at three Merovingian sites in Germany were examined by non-destructive methods. The coloring compounds at the surface of the glass beads can be characterized as $Pb_2SnSbO_{6.5}$ for the yellow beads and as Cu_2O for the ochre beads.

1997 Analytische Bestimmung farbgebender Elemente und deren Verbindungen in Glasperlen merowingerzeitlicher Gräberfelder. In *Perlen: Archäologie, Techniken, Analysen*, edited by Uta von Freeden and Alfred Wieczorek, pp. 275-278. Kolloquien zur Vor- und Frühgeschichte 1.

Essentially the same as the previous report.

Hoffmann, P., S. Bichlmeier, M. Heck, C. Theune, and J. Callmer

1999 Glasmatrix der Perlen merowingerzeitlicher Frauengräber von Eichstetten und Endingen. *Archäologisches Korrespondenzblatt* 29(3):395-406.

On the composition of the glass beads from Merovingian women's graves at Eichstetten and Endingen, Germany.

2000 Chemical Composition of Glass Beads of the Merovingian Period from Graveyards in the Black Forest, Germany. *X-Ray Spectrometry* 29(1):92-100.

White, orange, green, and brown glass beads from women's burials of the Merovingian period were scientifically characterized by X-ray fluorescence analysis, scanning electron microscopy, electron probe microanalysis, and X-ray diffraction.

Hoffmann, P., M. Heck, and C. Theune

2008 Chemische und mineralogische Untersuchungen an Glas: Zur Herstellung merowingerzeitlicher Glasperlen. In *Archäometrie: Methoden und Anwendungsbeispiele naturwissenschaftlicher Verfahren in der Archäologie,* edited by A. Hauptmann and V. Pingel, pp. 110-124. Schweizerbart, Stuttgart.

The chemical and mineralogical study of Merovingian glass beads has led to an understanding of their production.

Holzer, Veronika

1999 Sechs späthallstatt-/frühlatènezeitliche Glasperlen aus Vicenice, Böhmen. *Annalen des Naturhistorischen Museums in Wien, Serie A* 101:81-96.

Presents the results of Energy dispersive X-ray Fluorescence analysis of large, decorated, yellow glass beads of the Late Hallstatt/early La Tène periods from Vicenice, Bohemia, Czech Republic.

Höppner, B., M. Bartelheim, M. Huijsmans, R. Krauss, K.-P. Martinek, E. Pernicka, and R. Schwab

2005 Prehistoric Copper Production in the Inn Valley (Austria) and the Earliest Copper in Central Europe. *Archaeometry* 47(2):293-315.

Analyses of very early copper material from a critical region. A small bead of rolled sheet copper may indicate contact with the Carpathian Basin (pp. 311-312).

Horsley T. and C. Mortimer

1997 *Compositional and Structural Analysis of the Glass Beads from Boss Hall and Buttermarket (St Stephen's Lane) Early Anglo-Saxon Cemeteries, Ipswich. Suffolk.* English Heritage, Ancient Monuments Lab, London.

Presents analyses by XRF and EDX of a range of beads from 6th-7th centuries burials. Beads were soda-lime-silica glass. England, United Kingdom.

Horvath, Judith

2016 X-ray Testing Results for the Burmese Gold Beads. In *Burmese Gemstone Amulets and Talismans, Vol. 1,* edited by Terence Tan, Susan Conway, József Takács, and István Zelnik, pp. 42-49. Hungarian Southeast Asian Research Institute, Budapest.

On the composition of gold beads in the collection of Burmese artifacts held by the Department of Mineralogy of the Eötvös Loránd University and at the Hungarian Southeast Asian Research Institute.

Hrubý, Petr, Petr Hejhal, Karel Kašák, Karel Malý, and Jiří Valkony

2009 The Deserted Baroque Glassworks in the Cadastral Territory of Nová Vesnear Božejov (District of Pelhřimov). *Studies in Post-Medieval Archaeology* 3:479-500.

This glassworks is important in that it was the only one east of the Šumava Mountains, Czech Republic, to produce an assortment of glass jewelry typical for the Šumava Mountains glassmaking circle of the 17th-18th centuries: furnace-wound glass rosary beads. Information is provided re: chemical composition.

Huisman, D.J., J. van der Laan, G.R. Davies, B.J.H. van Os, N. Roymans, B. Fermin, M. Karwowski

2017 Purple Haze: Combined Geochemical and Pb-Sr Isotope Constraints on Colourants in Celtic Glass. *Journal of Archaeological Science* 81:59-78; https://www.academia.edu/32312183/.

Hand-held XRF analyses of Late Iron Age Celtic (La Tène) bracelet fragments from the Netherlands and Austria and Early Iron Age beads from the Netherlands revealed they were all composed of soda-silica-lime glass, which has a presumed origin in the Eastern Mediterranean.

Huisman, D.J., B.J.H. van Os, J. van der Laan, D.J.M. Ngan-Tillard, I. Joosten, and H.A.C. Fermin

2012 The Strange Case of 60 Frothy Beads: Puzzling Early Iron Age Glass Beads from the Netherlands. *Proceedings of the 39th International Symposium for Archaeometry, Leuven,* pp. 228-231.

A group of small blue-green glass beads containing numerous bubbles appear to be the result of local, inexpert, reworking of imported glass objects. The air bubbles could be the result of re-melting of the glass fragments or objects.

Huisman, Hans, Marion Aarts, Mirjam Kars, Fardau Mulder, Dominique Ngan-Tillard, and Bertil van Os

2019 Maken en handelen: Merovingische kralen uit het Sittard-Kemperkoul grafveld geanalyseerd. *Paleo-aktueel* 30:65-73; https://www.academia.edu/56507253/.

Presents a chemical analysis of Merovingian beads from the Sittard-Kemperkoul burial ground in the Netherlands.

Hulínský, V. and E. Černá

2001 Microanalysis of Early Medieval Glass Beads and its Importance in Archaeological Research. *Annales du 15^{e} congrès de l´Association pour l´histoire du verre, Corning, New York,* pp. 116-121.

Hulínský, Václav, Šárka Jonášová, and Kateřina Tomková

2012 Skleněné korálky z pohřebišť na katastru Žalova z pohledu jejich chemického složení [Glass Beads from the Burial Grounds in the Žalov Municipal Cadastre Based on their Chemical Composition]. In *Levý Hradec v zrcadle archeologických výzkumů. Pohřebiště. Díl I* [Levý Hradec in the Mirror of Archaeological Excavations. Cemeteries. Part I], edited by Kateřina Tomková, pp. 336-341. Institute of Archaeology of the Czech Academy of Sciences, Prague. https://www.academia.edu/45581640/.

Reports the results of the chemical analysis (SEM-EDS) of glass beads from two burial grounds of the 9th-10th centuries in the Czech Republic. German summary.

Hull, Sharon Kaye

2012 Turquoise Exchange and Procurement in the Chacoan World. Ph.D. thesis. Department of Anthropology, University of Manitoba, Winnipeg.

Sixty-two turquoise artifacts (including beads and pendants) recovered from several sites in the American Southwest were analyzed using Secondary Ion Mass Spectrometry (SIMS). Their compositions were compared to those of geological samples from 21 turquoise resource areas in the region, with the result that the likely turquoise source for 35 of the artifacts could be determined.

Iizuka, Yoshiyuki

2012 Analytical Report of Glass Beads from Hoa Diem Site, Khanh Hoa, Viet Nam. In *The Excavation of Hoa Diem in Central Vietnam,* edited by M. Yamagata and K. Suzuki, pp. 221-225. Bulletin of Institute of International Culture, Showa Women's University 17.

Reports on SEM-EDS analysis of not only glass beads, but copper and stone (agate) as well.

Ilon, Gábor and Zsolt Kasztovszky

2016 Untersuchung spätbronzezeitlicher Glasperlen aus West-Ungarn / Analysis of Late Bronze Age Glass Beads from Western Hungary. *Archeometriai Műhely* XIII(1):55-68; https://www.academia.edu/25100221/.

The beads studied represent the Late Tumulus-Early Urnfield culture (Bz C2-Ha A1). In German with English summary.

Insoll, Timothy

2001 India and Africa: A Survey of Cornelian Mines in Gujarat. *Bead Study Trust Newsletter* 39:7-10; https://www.societyofjewelleryhistorians.ac.uk/bead_study_trust.

Carnelian samples from 10 different workings/locations in western India were elementally analyzed so they could be compared with beads from archaeological contexts in West and West-Central Africa.

Insoll, Timothy and Kuldeep Bhan

2001 Carnelian Mines in Gujarat. *Antiquity* 75(289):495-496.

Short article on collecting carnelian samples from western India for geochemical analysis to help identify trade patterns of beads from the area.

Insoll, Timothy, Nadia Khalaf, Rachel MacLean, Hannah Parsons-Morgan, Nicholas Tait, Jane Gaastra, Alemseged Beldados, Alexander J.E. Pryor, Laura Evis, and Laure Dussubieux

2021 Material Cosmopolitanism: The Entrepot of Harlaa as Islamic Gateway to Eastern Ethiopia. *Antiquity* 95:487-507; https://www.academia.edu/45662463/.

Beads appear to have been an important commodity at Harlaa, with evidence for agate, glass, and shell beadmaking. LA-ICP-MS analysis of four beads from the workshop complex indicates the importation of some beads from Central Asia, the Middle East (possibly Mamluk Egypt), and Sri Lanka/South India.

Insoll, Timothy, David A. Polya, Kuldeep Bhan, Duncan Irving, and Kym Jarvis

2004 Towards an Understanding of the Carnelian Bead Trade from Western India to Sub-Saharan Africa: The Application of UV-LA-ICP-MS to Carnelian from Gujarat, India, and West Africa. *Journal of Archaeological Science* 31:1161-1173.

Outlines the results of chemical analysis and subsequent principal component analysis undertaken in an attempt to differentiate Gujarati and West African carnelian samples, and thus begins to allow inferences to be made regarding a possible trade in carnelian between these two regions primarily in the medieval period, based upon more objective data.

Ivanova, Silviya and Ivelin Kuleff

2009 Archaeological Amber from the Late Bronze and Iron Ages from the Territory of Present Bulgaria. *Archaeologia Bulgarica* XIII(3):23-46; https://www.academia.edu/510174/.

Discusses relevant amber finds (mostly beads) and provides compositional data.

Jackson, Caroline M.

2016 Four Blue Beads from Gardom's Edge. *Journal of Glass Studies* 58:11-20; http://eprints.whiterose.ac.uk/106274/.

Four blue glass bead fragments from a prehistoric site (either Bronze Age or Iron Age) in the upland area of the Peak District of central England were analyzed to determine their composition, date, and origin.

Jackson, Caroline M. and Sarah Paynter

2022 Baubles, Bangles and Beads: Recycling Coloured Glasses in the British Iron Age and Roman Periods. *Archaeometry*; https://doi.org/10.1111/arcm.12767.

Discusses the possible types and sources of trade glass, the challenges of recycling mono- and polychrome glass in different colors, and the unconventional methods used by glassworkers on the periphery of Roman influence to extend and modify colored glass to produce distinctive items in order to express their identity.

Jacobson, L., C.A. Pineda, D. Morris, M. Peisach, and A.E Pillay

1996 A Preliminary Report on the PIXE Analysis of Ostrich Eggshell and its Potential for Provenance Studies in Southern Africa. In *Archaeometry 1994: The Proceedings of the 29th International Symposium on Archaeometry, Ankara 9-14 May 1994,* edited by S. Demirci, A.M. Özer, and G.D. Summers, pp. 273-278. https://www.academia.edu/1842943/.

Ostrich-eggshell beads were used both in Hxaro exchange networks as well as more commercial trade relationships. By sourcing ostrich eggshell to different geological substrates it will be possible to reconstruct the extent and identity of these networks thus enabling a poorly understood aspect of San history to be written.

Janssens, Koen H.A. (ed.)

2013 *Modern Methods for Analysing Archaeological and Historical Glass.* John Wiley and Sons, Chichester, United Kingdom.

Members of the Association Internationale pour l'Histoire du Verre and other scholars present a comprehensive overview of current techniques for the analysis of glass composition for both archaeological and historical glass, including beads.

Janz, Lisa, James K. Feathers, and George S. Burr

2015 Dating Surface Assemblages Using Pottery and Eggshell: Assessing Radiocarbon and Luminescence Techniques in Northeast Asia. *Journal of Archaeological Science* 57:119-129.

New radiocarbon and luminescence dates on collections from the Gobi Desert of Mongolia and China reveal that Accelerator Mass Spectrometry and luminescence are highly complementary methods and produce results consistent with expected archaeological ages, while ostrich eggshell dates (derived from beads and shell fragments) were older than the associated site assemblages.

Jeunesse, Christian

2002 La coquille et la dent. Parure de coquillage et évolution des systèmes symboliques dans le Néolithique danubien (5600-4500). In *Matériaux, productions, circulations du néolithique à l'Age du Bronze,* edited by J. Guilaine, pp. 49-64. Ed. Errance, Paris.

On shell ornaments (including beads and pendants) and the evolution of symbolic systems in the Danubian Neolithic.

Jian, Zhu, Yimin Yang, Wei Xu, Dongliang Chen, Junqing Dong, Lihua Wang, and Michael D. Glascock

2012 Study of an Archaeological Opaque Red Glass Bead from China by XRD, XRF, and XANES. *X-Ray Spectrometry* 41:363-366.

A rare archeological find of red glass beads (AD 300-400) discovered in Leijiaping, Badong County, Hubei, China, was subjected to an advanced structural analysis using micro synchrotron X-ray near-edge absorption spectroscopy. This study reveals that this form of analysis is an advanced and nondestructive technology to study ancient glass objects.

Johnson, Diane, Joyce Tyldesley, Tristan Lowe, Philip J. Withers, and Monica M. Grady

2013 Analysis of a Prehistoric Egyptian Iron Bead with Implications for the Use and Perception of Meteoritic Iron in Ancient Egypt. *Meteoritics & Planetary Science* 48(6):997-1006; https://www.academia.edu/4058473/.

Tube-shaped beads excavated from grave pits at the prehistoric Gerzeh cemetery, ca. 3300 BCE, represent the earliest known use of iron in Egypt. Using a combination of scanning electron microscopy and micro X-ray microcomputer tomography, the authors show that microstructural and chemical analysis of a Gerzeh iron bead is consistent with a cold-worked iron meteorite.

Jones, Travis W., Jennifer Birch, Ronald F. Williamson, Timothy J. Abel, Robert J. Speakman, and Louis Lesage

2018 Steatite Characterization Using X-ray Fluorescence and Insights into Northern Iroquoian Interregional Interaction. *Journal of Archaeological Science: Reports* 20:506-515; https://www.academia.edu/42992148/.

Provides compositional data from an assemblage of 100 steatite beads and pipes deriving from 11 Northern Iroquoian sites in southern Ontario and New York.

Kaal, Joeri, María Martín Seijo, Cesar Oliveira, Ewa Wagner-Wysiecka, Victoria E. McCoy, Monica M. Solorzano Kraemer, Alexander Kerner, Philip Wenig, Carlos Mayo, and Julia Mayo

2020 Golden Artefacts, Resin Figurines, Body Adhesives and Tomb Sediments from the Pre-Columbian Burial Site El Caño (Gran Cocle, Panama): Tracing Organic Contents Using Molecular Archaeometry. *Journal of Archaeological Science* 113, 105045; https://www.academia.edu/40995295/.

The figurines and beads found with a burial were found to be formed from *Hymenaea* resin.

Kadikova, Irina F., Ekaterina A. Morozova, Tatyana V. Yuryeva, Irina A. Grigorieva, and Vladimir A. Yuryev

2020 Study of Deteriorating Semiopaque Turquoise Lead-Potassium Glass Beads at Different Stages of Corrosion Using Micro-FTIR Spectroscopy. *Mater. Res. Express* 7, 025203; https://www.academia.edu/79828266/.

Examines the cause of the fatal corrosion of glass beads on 19th-century beadwork in museum collections.

Kadikova, Irina F., Tatyana V. Yuryeva, Ekaterina A. Morozova, Irina A. Grigorieva, Ilya B. Afanasyev, Vladimir Y. Karpenko, and Vladimir A. Yuryev

2022 Glass Alteration in the Process of Long-Term Corrosion Caused by Internal Stress: A Comparative Study of Degraded and Intact Domains in 19th Century Semi-Opaque Turquoise Glass Seed Beads Using Micro-FTIR Spectroscopy and SEM. arXiv:2201.04954; https://www.researchgate.net/publication/357823484.

Reveals that the corrosion is caused by several mutually connected processes developing in parallel and intensifying one another.

Kadikova, I.F., T.V. Yuryeva, E.A. Morozova, I.A. Grigorieva, M.V. Lukashova, I.B. Afanasyev, and V.A. Yuryev

2019 Crystals in the 19th Century Glass Beads. Paper presented at Technart 2019, Bruges, Belgium, 7-10 May; https://www.researchgate.net/publication/332781545.

Some types of 19th-century glass beads (translucent turquoise, green, red-white and some others) are subject to more intense destruction than others, apparently due to the presence of nano and micro crystals in the glass.

Kadlečíková, Magdaléna, Juraj Breza, Ľubomír Vančo, Miloš Gregor, and Igor Bazovský

2015 Raman Spectroscopy of Ancient Beads from Devín Castle near Bratislava and of Four Intaglios from Other Archaeological Finds in Slovakia. *The Journal of Gemmology* 34(6):510-517; https://www.academia.edu/48067494/.

Violet and red-to-orange beads from a necklace and bracelet dated from the 11th-12th centuries that were found in an ancient cemetery near Bratislava, were found to be fluorite (previously described as amethyst) and carnelian, respectively.

Kalicz, Nándor, Zsuzsanna Siklósi, Gabriella Schöll-Barna, Bernadett Bajnóczi, George H. Hourmouziadis, Fotis Ifantidis, Aikaterini Kyparissi-Apostolika, Maria Pappa, Rena Veropoulidou, and Christina Ziota

2012 Aszód-Papi földek késő neolitikus lelőhelyen feltárt kagylóékszerek származási helyének meghatározása stabilizotóp-geokémiai módszerrel [Stable Isotope Geochemical Provenance Study of Shell Ornaments from Aszód-Papi-földek]. In *Environment – Human – Culture: Dialogue between Applied Sciences and Archaeology*, edited by Attila Kreiter, Ákos Pető, and Beáta Tugya, pp. 317-326. Hungarian National Museum Centre for National Cultural Heritage, Budapest.

Beads and bracelets of *Spondylus* shell excavated at a Late Neolithic site in central Hungary were analyzed to help interpret exchange systems and the social role of shell ornaments during that time period.

Kalkreuth, Wolfgang, Claus Andreasen, Henrik I. Petersen, and Lars Stemmerik

2012 The Petrology and Provenance of Coal Artifacts from Thule Settlements in North-eastern Greenland. *Bulletin of the Geological Society of Denmark* 60:1-13; https://www.academia.edu/66981487/.

Coal petrographic techniques were used to trace the origin of the coal used to produce two large 15th-century perforated pendants or amulets. One is in the form of a female figure; the other is oval in form. The coal was found to be of local origin and not imported from known "mines" in Arctic Canada.

Kalsbeek, Nicoline and Knud Botfeldt

2007 Identification of Amber and Amber Imitations by Infrared Spectroscopy. *Meddelelser om konservering* 1:3-11.

Twenty museum objects – mostly beads – were analyzed to distinguish those of Baltic amber from amber imitations.

Kang, Hyung-Tae, Nam-Chul Cho, Min-Su Han, Woo-Hyun Kim, and Ji-Youn Hong

2009 Chemical Composition and Lead Isotope Ratio of Glass Beads Excavated from Eunpyeong Newtown Site. *Journal of Conservation Science* 25(3):335-345; https://www.e-jcs.org/journal/view.php?number=326.

The beads are mainly potash glass (K_2O-CaO-SiO_2) and potash-lead glass (K_2O-PbO-SiO_2), while some appear to be quartz. South Korea. In Korean with English abstract.

Kang, Hyung-Tae and Eun-Young Yun

2012 Chemical Compositions and Lead Isotope Ratios of Some Glass Beads from Seokga-tap, Gyeongju. *Conservation and Restoration of Cultural Heritage* 1(1):3-8.

Of the four beads analyzed, three were found to be of lead glass (PbO-SiO_2) and one was of potash-lead glass (K_2O-PbO-SiO_2). The latter is dated to the end of the 10th century. South Korea.

Kang, H.T., E.Y. Yun, and J.Y. Ahn

2008 Chemical Compositions of Glass Beads from Tombs of Chunburi, Ulleung-do, Ulleung-do Site. National Museum of Korea, *Report of Research of Antiquities* 38:361-372.

South Korea.

Kanungo, Alok K. and Robert H. Brill

2009 Kopia, India's First Glassmaking Site: Dating and Chemical Analysis. *Journal of Glass Studies* 51:11-25.

Reports on the analysis of glass (including beads) recovered from Kopia, a major glassmaking site in Uttar Pradesh, which was occupied from 700 BC to around AD 600.

Kaparou, Maria and Artemios Oikonomou

2022 Mycenaean through Hellenistic Glass in Greece: Where Have We Got to? *Archaeological and Anthropological Sciences* 14, 92; https://www.academia.edu/78123058/.

Aims to consolidate aspects of how glass was produced, traded, and used from the Late Bronze Age through Hellenistic times. Beads enter into the discussion.

Karches, Barbara

2012 Untersuchung spätlatène-/frühkaiserzeitlicher Glasperlen auf ihre Elementzusammensetzung mittels instrumenteller Neutronenaktivierungsanalyse. Thesis in Chemistry. Institut für Kernchemie der Johannes Gutenberg-Universität, Mainz.

On determining the elemental composition of late La Tène to early Imperial period glass beads using instrumental neutron activation analysis.

Karklins, Karlis, Laure Dussubieux, and Ron G.V. Hancock

2015 A 17th-Century Glass Bead Factory at Hammersmith Embankment, London, England. *Beads: Journal of the Society of Bead Researchers* 27:16-24; https://www.academia.edu/20300753/.

Excavations in West London uncovered the remains of two glass furnaces with associated wasters relating to the manufacture of drawn glass beads during the second quarter of the 17th century. The site is significant as it represents the first archaeological evidence for the production of glass beads in post-medieval England. Comparisons of the chemical compositions of the Hammersmith beads with those of beads from a contemporary Amsterdam factory reveal a number of similarities as well as differences.

Karklins, K., R.G.V. Hancock, J. Baart, M.L. Sempowski, J.-F. Moreau, D. Barham, S. Aufreiter, and I. Kenyon

2002 Analysis of Glass Beads and Glass Recovered from an Early 17th-Century Glassmaking House in Amsterdam. In *Archaeological Chemistry: Materials, Methods and Meaning*, edited by K.A. Jakes, pp. 110-127. American Chemical Society, Symposium Series 831. https://www.academia.edu/98238439/.

Presents the results of INAA analysis of a large sample of variously colored beads recovered from the wasters of a glassworks in Amsterdam. Initially believed to have operated from 1601 to 1610, that date was subsequently revised to 1621-1657.

Karklins, Karlis, Alicia Hawkins, Heather Walder, and Scott Fairgrieve

2018 Florida Cut-Crystal Beads in Ontario. *Beads: Journal of the Society of Bead Researchers* 30:44-51; https://www.academia.edu/40475947/.

Discusses three faceted rock-crystal beads generally termed Florida Cut-Crystal which were found in the legacy collections of two 17th-century Huron-Wendat sites in southern Ontario. Includes details about their manufacture and chemical composition.

Karklins, Karlis, Sibylle Jargstorf, Gerhard Zeh, and Laure Dussubieux

2016 The Fichtelgebirge Bead and Button Industry of Bavaria. *Beads: Journal of the Society of Bead Researchers* 28:16-37; https://www.academia.edu/32800480/.

The Fichtelgebirge bead and button industry is especially notable for two things: 1) the utilization of furnace-winding technology which, based on our current knowledge, was not employed to a significant degree elsewhere in Europe during the post-medieval period, and 2) the localized use of Proterobas, a greenish igneous rock, to produce opaque black beads and buttons without any additives until the early 19th century. This article presents a history of the industry and describes the products and the technology involved. It also provides a preliminary assessment of the chemical composition of the various products.

Karklins, K., J. Kottman, R.G.V. Hancock, M.L. Sempowski, A.W. Nohe, J.-F. Moreau, S. Aufreiter, and I. Kenyon

2001 On the Chemical Variability of Middelburg Glass Beads and Rods. In *Australasian Connections and New Directions, Proceedings of the 7th Australasian Archaeometry Conference*, edited by M. Jones and P. Sheppard, pp. 187-195. Department of Anthropology, The University of Auckland, Auckland, New Zealand.

Analysis of beads likely produced in Middelburg, The Netherlands, in the 17th century.

Karwowski, Maciej

2006 Major Questions Concerning Celtic Glass from the Eastern Regions of La Tène Culture. *Analecta Archaeologica Ressoviensia* 1:133-159.

Discusses glass bracelets, ring-beads, and tiny rings, including their elemental composition.

Karwowski, Maciej, Christoph Jokubonis, and Shokufeh Zamini

2002 Untersuchungen zur Bestimmung von Metallanteilen (Z>20) im Glas der Perlen aus den Gräbern 185 und 233 von Pottenbrunn. In *Das eisenzeitliche Gräberfeld von Pottenbrunn*, edited by Peter C. Ramsl, pp. 353-357. Fundberichte aus Österreich, Materialhefte A 11. https://www.academia.edu/5355303/.

Reports on the composition of two glass beads from La Tène graves excavated in northern Austria.

2005 Annex 2: Untersuchungen zur Bestimmung von Metallanteilen (Z>20) im Glas der Ringperlen aus Gräbern Nr. 33 und 66. In *Podwiesk Fundstelle 2: Ein Gräberfeld der Oksywie-Kultur im Kulmer Land*, by E. Bokiniec, pp. 145-150. Monumenta Archaeologica Barbarica 11.

On the composition of glass beads of the Oksywie culture recovered from a cemetery in Podwiesk, north-central Poland.

Karwowski, Maciej, Christoph Jokubonis, Shokufeh Zamini, Peter Wobrauschek, and Grehard Trnka

2005 High-Z Element Concentrations in Glass of La Tène Culture Ornaments. In *Proceedings of the 33rd International Symposium on Archaeometry, 22-26 April 2002, Amsterdam*, edited by H. Kars and E. Burke, pp. 207-212. Geoarchaeological and Bioarchaeological Studies 3. https://www.academia.edu/5355342/.

Energy-dispersive X-ray fluorescence analysis (EDXRF) was used to determine the composition of glass beads and bracelets recovered from sites in Austria and Poland dated ca. 250-50 BC.

Karwowski, Maciej, Katarzyna Trybała-Zawiślak, and Lucyna Samek

2009 Archeometryczne badania szklanych paciorków z cmentarzyska tarnobrzeskiej kultury łużyckiej na stan. 2 w Kłyżowie. In *Tarnobrzeska kultura łużycka – Źródła i interpretacje*, edited by S. Czopek and K. Trybała-Zawiślak, pp. 463-477. Collection Archaeologica Resoviensis 11. https://www.academia.edu/5355782/.

Reports on the archaeometric analysis of glass beads from a cemetery of the Tarnobrzeska Culture at Kłyżów, Poland.

Kassianidou, Vasiliki and Andreas Charalambous

2019 Chemical Analyses of Copper Objects and Faience Beads Using Portable X-Ray Fluorescence. In *Figurine Makers of Prehistoric Cyprus: Settlement and Cemeteries at Souskiou*, edited by Edgar Peltenburg, Diane Bolger, and Lindy Crewe, pp. 279-286. Oxbow Books, Oxford. https://www.academia.edu/91001213/.

Analysis of the faience beads recovered from cemetery sites of the Chalcolithic period on Cyprus reveals they are imported good rather than the products of local workshops.

Kasztovszky, Zsolt, Veronika Szilágyi, and Istvá Sajó

2010 Neolitikus rézgyöngyök vizsgálata Polgár-Csőszhalom lelőhelyről – előzetes eredmények [Scientific Investigation of Neolithic Copper Beads from Polgár-Csőszhalom – Preliminary Results]. *Archeometriai Műhely* 2:137-140; https://www.academia.edu/15718348/.

Reports on the condition of a unique copper-bead necklace recovered from a site of the Neolithic Csőszhalom Culture (5000-4400 BC) in Hungary.

Kelly, Gwendolyn O.

2014 Supporting Information. SI Text S5: Beads from Lakaton'i Anja 2011 Excavation Season. In *Stone Tools and Foraging in Northern Madagascar Challenge Holocene Extinction Models*, by Robert E. Dewar, Chantal Radimilahy, Henry T. Wright, Zenobia Jacobs, Gwendolyn O. Kelly, and Francesco Berna, pp. 12583-12588. Proceedings of the National Academy of Science 110(31).

Reports on the composition of six Indo-Pacific glass beads dating to ca. 1200-1400 CE.

Kemp, V., A. McDonald, F. Brock, and A.J. Shortland

2020 LA-ICP-MS Analysis of Late Bronze Age Blue Glass Beads from Gurob, Egypt. *Archaeometry* 62(1):42-53; https://onlinelibrary.wiley.com/doi/epdf/10.1111/arcm.12501.

The beads were colored by copper and the trace element concentrations were compositionally consistent with glasses from Mesopotamia rather than from Egypt. Therefore, they represent a rare example of Mesopotamian glass to be discovered in Egypt.

Kemp, V., A. McDonald, and A.J. Shortland

2019 Ancient Biographies: Trace Element Analysis to Investigate Provenance and Transportation Mechanisms of Late Bronze Age Glass. *Archaeological and Environmental Forensic Science* 1(2):161-174; https://www.researchgate.net/publication/333488659.

LA-ICP-MS analysis of a scaraboid blue glass bead excavated at Gurob, Egypt, revealed that it likely originated in Mesopotamia.

Kenoyer, J. Mark

2011 Comments on the SEM Images of Silicon-Based Impressions of Beads Holes. In *Excavations of Farmana, District Rohtak, Haryana, India: 2006-2008,* edited by V. Shinde, T. Osada, and M. Kumar, pp. 469-470. Indus Project Research Institute for Humanity and Nature, Kyoto.

2016 Bead Drill Hole SEM Analysis. In *Tel F6 on Failaka Island: Kuwaiti-Danish Excavations 2008-2012,* by Flemming Højlund and Aiysha Abu-Laban, pp. 198-206. Jutland Archaeological Society Publications 92.

2017 Using SEM to Study Stone Bead Technology. In *Stone Beads of South and Southeast Asia: Archaeology, Ethnography and Global Connections*, edited by Alok Kumar Kanungo, pp. 409-438. Indian Institute of Technology, Gandhinagar.

Presents a detailed discussion of the use of scanning electron microscopy to garner details regarding bead production techniques and how to prepare specimens for study. Also provides an overview of the various recorded drilling techniques with SEM images of each.

Kenoyer, J. Mark, Asa Cameron, Dashzeveg Bukhchuluun, Chunag Amartuvshin, Batdalai Byambatseren, William Honeychurch, Laure Dussubieux, and Randall Law

2021 Carnelian Beads in Mongolia: New Perspectives on Technology and Trade. *Archaeological and Anthropological Sciences* 14(6); https://doi.org/10.1007/s12520-021-01456-4.

The technological, stylistic, and chemical analyses of carnelian beads from several sites in Mongolia provide evidence for local production and use of such beads from the Late Bronze Age (ca. 1400-1000 BCE) through the Xiongnu period (ca. 250/200 BCE-CE 150). Beads dating to

the historical Mongol Empire (ca. 12th-14th centuries) demonstrate expanding trade networks that link eastern Eurasia to South Asia and beyond.

Kenyon, Ian, R.G.V. Hancock, and S. Aufreiter
1995 Neutron Activation Analysis of A.D. 1660-1930 European Copper-Coloured Blue Glass Trade Beads from Ontario, Canada. *Archaeometry* 37(2):323-337.
An early attempt to identify a time frame for distinctive glass bead chemistries using elemental composition.

Kenyon, Ian, Susan Kenyon, Ron Hancock, and Susan Aufreiter
2009 Neutron Activation Analysis of Some 19th-century Faceted Glass Trade Beads from Ontario, Canada, that Have Chemical Compositions Resembling Bohemian Glass. *Beads: Journal of the Society of Bead Researchers* 21:78-80. Reprinted from *The Bead Forum* 27:4-9 (1995); https://www.academia.edu/39087830/.

Kim, Christopher F.
2012 Early Chinese Lead-Barium Glass: Its Production and Use from the Warring States to Han Periods (475 BCE-220 CE). Brown University, Providence, RI.
A detailed discussion of lead-barium glass which was commonly used to produce beads in China during the period under discussion.

Kim, Eun A and Gyu Ho Kim
2022 Material Characteristics and Comparison of Silver Foil Glass Beads Excavated from the Tomb of King Muryeong in Korea. *Applied Sciences* 12, 6385; https://doi.org/10.3390/app12136385.
Investigates the chemical composition of the 171 gold and silver foil beads found on the queen's chest. The tomb dates to the 6th century AD.

Kim, Eun-A, Gyu Ho Kim, Ji Won Kang, and Cheon Su Yun
2020 A Characteristics on the Ancient Glass Beads Excavated from the Site of Hapgang-ri in Sejong, Korea. *Journal of Conservation Science* 36(5):405-420; https://doi.org/10.12654/JCS.2020.36.5.10.
Discusses the form, color, manufacturing techniques, and chemical composition of the beads that date to the late 2nd and early 3rd centuries. In Korean with English abstract.

Kim, Eun-A, Je Hyun Lee, and Gyu Ho Kim
2021 A Characteristic Analysis of Glass Beads in Geumgwan Gaya, Korea (I). *Journal of Conservation Science* 37(3):232-244; https://doi.org/10.12654/JCS.2021.37.3.04.
Describes and provides the chemical composition of glass beads recovered from Geumgwan Gaya (AD 43-532). In Korean with English abstract.

Kim, Gyu-Ho

2004 Archaeological Chemistry of Glasses Excavated at Songdong-ri Tombs, Sangju, Korea. *Journal of Conservation Science* 16:104-109; https://www.e-jcs.org/journal/view.php?number=223.

Analysis of glass beads from the site revealed a change in their composition over time. A potash and soda glass group was present in the 4th century while a potash and mixed-alkali group marked the 17th century. In Korean with English abstract.

Kim, Gyu-Ho, Woo Young Huh, and Dong Won Kim

1998 SEM-EDS Microanalysis of Glass Beads Excavated from Yangdong-ri Remains, Kimhae. *Journal of the Korean Society of Conservation Science for Cultural Heritage* 7(1):23-30.

Reports the composition of ancient beads from a site in South Korea.

Kim, Gyu-Ho and Eun-A Kim

2019 An Analysis of a Crucible Survival and a Bead Fragments Excavated at Iksan Wanggung-ri Site in Korea. *Journal of Conservation Science* 35(1):81-89; https://doi.org/10.12654/JCS.2019.35.1.09.

Reports the results of both chemical compositional and lead isotope analyses of the glass beads recovered from a 7th-century workshop area in South Korea. The glass is among the earliest lead-silica glass type in East Asia. In Korean with English abstract.

Kim, Jiyoung, Chan Hee Lee, and Jin Young Kim

2008 Material Characteristics and Provenance Interpretation for Chloritic Beads from the Boseong Geoseokri and Haenam Buntori Sites, Korea. *Journal of Conservation Science* 23:25-37; https://www.e-jcs.org/journal/view.php?number=281.

The beads are composed of SiO_2, Al_2O_3, MgO, and FeO as major components and trace amounts of K_2O, CaO, and Na_2O. In Korean with English abstract.

Kim, Na-Young and Gyu-Ho Kim

2012 Chemical Characteristic of Glass Beads Excavated from Bakjimeure Site in Asan, Korea. *Journal of Conservation Science* 28(3):205-216; https://www.e-jcs.org/journal/view.php?number=442.

Glass beads excavated from Mahan tombs consist of potash glass (20%) and soda glass (80%). In Korean with English abstract.

2013 Characteristics and Classification of Red Brown Glass Beads Excavated in Korean Peninsula. *Journal of the Korean Conservation Science for Cultural Properties* 29(3):279-286; https://www.e-jcs.org/journal/view.php?number=488.

Analysis of 141 samples from 12 sites of the Three Kingdom Period reveals that the red-brown beads may be divided into three types according to the chemical composition of the stabilizers (CaO and Al_2O_3) and soda raw materials (MgO and K_2O). In Korean with English abstract.

2015 Characteristic Comparison of the Composition Classification on Potash Glass Beads Excavated in Korea. *Journal of Conservation Science* 31(3):255-265; https://www.e-jcs.org/journal/view.php?number=568.

Analysis of 281 potash-glass beads from 30 sites revealed that three types could be identified based on the stabilizer content. In Korean with English abstract.

Kirk, Susanna

2009 The Vitreous Materials from the 2nd Millennium BC City of Nuzi: Their Preservation, Technology and Distribution. Ph.D. thesis. Department of Applied Science, Security and Resilience, Cranfield University, UK.

Focused on the vitreous objects (beads being the most common items) from Nuzi, a mid-2nd millennium BC site in Iraq, this project presents the first large-scale study of the preservation and alteration of Late Bronze Age vitreous materials from the Near East. Includes the results of compositional analysis.

Kivisto, Sarah A.

2016 Evaluating Paleoenvironmental and Landscape Mobility Dynamics: Stable Isotope and Strontium Isotope Analyses of Ostrich Eggshell at Spitzkloof Rockshelter, South Africa. M.A. thesis. Department of Anthropology, University of Toronto.

Isotope analyses were performed ostrich eggshell beads and shell fragments to assess climatic changes and where hunter gatherers might have been using the landscape for subsistence and risk moderating strategies.

Klehm, Carla and Laure Dussubieux

2022 Chemical Analysis of Precolonial Indian Ocean Glass Beads Found in the Southern African Interior: Linking Global Objects to Local and Regional Change. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 305-322. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.20.

Discuss Indian Ocean glass beads found in east-central Botswana, their chemical composition, the relationship to known typologies, and how these bead types relate to the sociopolitical and economic changes taking place in the southern African interior from the 7th-17th centuries.

Klochko, Viktor and Barbara Stopiak

1995 Glass Beads from Sofievka Cemetery. *Baltic-Pontic Studies* 3:243-246.

Presents the results of the chemical analysis of several glass beads recovered from a site in the eastern Ukraine which dates to the first half of the 3rd millennium BC.

Klysubun, W., Y. Thongkam, S. Pongkrapan, K. Won-in, J. T-Thienprasert, and P. Dararutana

2011 XAS Study on Copper Red in Ancient Glass Beads from Thailand. *Analytical and Bioanalytical Chemistry* 399(9):3033-3040.

Reports for the first time an advanced structural analysis of Thai ancient glass beads using synchrotron X-ray absorption spectroscopy (XAS) and energy-dispersive X-ray (EDX) spectrometry.

Knaf, Alice C.S., Catarina Guzzo Falci, Habiba, Casper J. Toftgaard, Janne M. Koornneef, Annelou van Gijn, Ulrik Brandes, Corinne L. Hofman, and Gareth R. Davies

2022 A Holistic Provenance and Microwear Study of Pre-Colonial Jade Objects from the Virgin Islands: Unravelling Mobility Networks in the Wider Caribbean. *Journal of Archaeological Science: Reports* 41, 103223; https://doi.org/10.1016/j.jasrep.2021.103223.

Demonstrates that the pan-Caribbean exchange of jade raw materials, pre-forms, or finished objects (including beads and pendants) during the Ceramic Age (400 BC to AD 1492) occurred on a more complex scale than previously thought involving jade sources in Guatemala, eastern Cuba, and the northern Dominican Republic.

Knific, Timotej and Žiga Šmit

2018 Zgodnjesrednjeveško steklo na Slovenskem: študij sestave in jagode iz halofitskega stekla [Early Medieval Glass in Slovenia: Analytical Study and Beads of Plant-Ash Glass]. *Arheološki Vestnik* 69:369-436; http://av.zrc-sazu.si/En/69/AV_69_10_Knific_Smit.html

A combined method of proton-induced X-ray and gamma-ray emission (PIXE, PIGE) was used to analyze glass beads and other glass items from early medieval sites in Slovenia. In Slovenian and English.

Koch, Leonie C.

2013 Von Hellas bis Hessen: Zu möglichen Importen gläserner Perlen während der spätesten Bronzezeit. In *Petasos. Festschrift für Hans Lohmann*, edited by Georg Kalaitzoglou and Gundula Lüdorf, pp. 149-161. Mittelmeerstudien 2.

On the possible import of glass beads to Germany from Greece or elsewhere to the east during the late Bronze Age based on the Late Urnfield hoard at Allendorf. Includes chemical analysis.

2014 Bronzezeitliches Glas. Die Frage nach seiner Herkunft, Antworten durch chemische Analysen und das Problem ihrer Interpretation. In *Ressourcen und Rohstoffe in der Bronzezeit: Nutzung – Distribution – Kontrolle,* edited by Bianka Nessel, Immo Heske, and Dirk Brandherm, pp. 87-99. Arbeitsberichte zur Bodendenkmalpflege in Brandenburg 26. https://www.academia.edu/12040967/.

Attempts to answer the question of the origin of Bronze Age glass by means of chemical analysis and the problem of their interpretation. Faience and glass beads are among the items analyzed.

2020 The Large Glass Beads of Leech Fibulae from Iron Age Necropoli in Northern Italy. *Beads: Journal of the Society of Bead Researchers* 32:3-14; https://www.academia.edu/45187054/.

Provides an overview of these adornments as well as insights into their production technology, chemical composition, and origin. The wide variety of these objects suggests the existence of several local glass workshops.

2020 An Overview of Vitreous Materials in Bronze Age Italy and Brief Perspectives on the Iron Age. In *From Past to Present. Studies in Memory of Manfred O. Korfmann*, edited by Stephan W.E. Blum, Turan Efe, Tobias L. Kienlin, and Ernst Pernicka, pp. 409-428. Studia Troica Monographien 11. https://www.academia.edu/44393006/.

Discusses the composition and likely sources of faience and glass beads and buttons.

2021 Glas und glasartiges Material in Italien zur Bronze- und Früheisenzeit – Forschungsstand und Perspektiven. In *Vom Künstlichen Stein zum durchsichtigen Massenprodukt: Innovationen in der Glastechnik und ihre sozialen Folgen zwischen Bronzezeit und Antike*, edited by Florian Klimscha, Hans-Jörg Karlsen, Svend Hansen, and Jürgen Renn, pp. 67-103. Berlin Studies of the Ancient World 67.

Sums up the state of research on faience and glass beads, faience buttons, and imported faience objects from the Eastern Mediterranean in Italy during the Bronze and Early Iron ages. Includes information about glass composition.

2022 Die Glasperlen des 8. und 7. Jhs. v. Chr. aus Verucchio (Emilia-Romagna, Italien). Die monochromen Perlen und Augenperlen. *Römische Mitteilungen* 128:8-41. https://publications.dainst.org/journals/rm/article/view/3969.

This article investigates monochrome glass beads and those decorated with dot or ring eyes recovered from sites of the 8th-7th centuries BC in Italy and beyond, including their chemistries.

Koh, Min Jeong, Hyung Tae Kang, Na Young Kim, and Gyu Ho Kim

2012 A Comparison in Characteristics of Chemical Composition of Glass Vessels Excavated from Neungsalli Temple in Buyeo, Korea, from Baekje Period. *Bulletin of the Korean Chemical Society* 33(12):4173-4179.

The analyzed material also included beads which were found to be soda glass of two sub-groups: soda-lime glass and high-alumina soda glass.

Kokora, Karolina

2016 Paciorek ze szkła ołowiowo-krzemowego znaleziony w Wolinie [Bead from Lead Silica Glass Found in Wolin]. *Archeologia Polski* LXI:171-190; https://www.academia.edu/36593416/.

Discusses the composition of a decorated glass bead from the late 10th or early 11th century excavated in Wolin, Poland.

2019 Glass Production in Early Mediaeval Volin after Jerzy Olczak and Elżbieta Jasiewiczowa – 55 Years Later. New Findings Regarding Glass Objects from Site 1 in Wolin. *Archeologia Polski* LXIV:283-338; https://www.academia.edu/42138304/.

Discusses the glass beads – both locally made and imported – excavated in Wolin, Poland. Includes information regarding their chemical composition. In Polish and English.

Koleini, Farahnaz, Philippe Colomban, and Innocent Pikirayi

2020 Post-15th Century European Glass Beads in Southern Africa: Composition and Classification Using pXRF and Raman Spectroscopy. *Journal of Archaeological Science: Reports* 29; https://www.sciencedirect.com/science/article/pii/S2352409X19306418.

Analysis identified six identified glass groups: soda-based plant ash (61%), potash-rich wood ash (14%), synthetic soda (8%), mixed alkali (4%), lead-soda (22%), and natron (4%). Except for soda-based plant ashes and natron (outliers), all the groups date back to the 19th century.

Koleini, Farahnaz, Philippe Colomban, Innocent Pikirayi, and Linda C. Prinsloo

2019 Glass Beads, Markers of Ancient Trade in Sub-Saharan Africa: Methodology, State of the Art and Perspectives. *Heritage* 2(3):2343-2369; https://www.academia.edu/49647272/.

This review addresses the history of glass production, the methodology of identification (morphology, color, elemental composition, glass nanostructure, coloring and opacifying agents and secondary phases) by means of various laboratory-based instruments. Attention is paid to the problems neglected such as the heterogeneity of glass (recycled and locally reprocessed glass).

Koleini, Farahnaz, L.H. Machiridza, I. Pikirayi, and P. Colomban

2019 The Chronology of Insiza Cluster Khami Phase Sites in South Western Zimbabwe: Compositional Insights from pXRF and Raman Analysis of Excavated Exotic Glass Finds. *Archaeometry*; DOI: 10.1111/arcm.12463.

Fourteen glass beads from five Khami period (AD 1400-1830) sites in Zimbabwe were analyzed with the intention of correlating the results with associated radiocarbon dates.

Koleini, Farahnaz, Innocent Pikirayi, and Philippe Colomban

2016 Raman (RS) and XRF Classification of Glass Trade Beads from Baranda (16-17th c. AD), Northern Zimbabwe. https://www.academia.edu/26869716/, accessed 8 August 2016.

A multi-analytical study of the beads reveals information about their composition, origin, and distribution.

2017 Revisiting Baranda: A Multi-Analytical Approach in Classifying Sixteenth/Seventeenth-Century Glass Beads from Northern Zimbabwe. *Antiquity* 91(357):751-764; https://www.researchgate.net/publication/314235609.

Compositional analysis of a large assemblage of imported glass beads from the trading site of Baranda reveals a South Asian origin for the majority of the beads.

Koleini, Farahnaz, Linda C. Prinsloo, Wim M. Biemond, Philippe Colomban, Anh-Tu Ngo, Jan C.A. Boeyens, and Maria M. van der Ryst

2015 Towards Refining the Classification of Glass Trade Beads Imported into Southern Africa from the 8th to the 16th Century AD. *Journal of Cultural Heritage* 16(2):159-172; https://www.academia.edu/28183566/.

Glass trade beads excavated at 11 sites along the upper reaches of the Limpopo River in Botswana are visually classified according to their morphological properties (color, size, etc.) and analyzed with Raman spectroscopy and portable X-ray fluorescence (XRF). Energy Dispersive Spectroscopy (EDS) of one bead shows that two types of glass were sintered together to form a recycled product.

Koleini, Farahnaz, Linda C. Prinsloo, Wim M. Biemond, Philippe Colomban, Anh-Tu Ngo, Jan C.A. Boeyens, Maria M. van der Ryst, and Koos van Brakel

2016 Unravelling the Glass Trade Bead Sequence from Magoro Hill, South Africa: Separating Pre-Seventeenth-Century Asian Imports from Later European Counterparts. *Heritage Science* 4(43); https://www.academia.edu/77101024/.

Demonstrates the use and archaeological application of Raman and XRF measurements to separate earlier imported beads from later counterparts by identifying glass nanostructure, as well as pigments and opacifiers, which were not used in bead series pre-dating the 17th century.

2017 Unraveling the Glass Trade Bead Sequence from Magoro Hill, Limpopo Province, South Africa. *The Bead Forum* 70:6-9; https://beadresearch.org/the-bead-forum-archive/.

A summary version of the previous article.

Koleini, Farahnaz, Linda C. Prinsloo, Philippe Colomban, Jan C.A. Boeyens, Maria M. van der Ryst, and Wim M. Biemond

2016 A Raman Spectroscopic (RS) Classification of Glass Trade Beads Recovered from Magoro Hill. https://www.academia.edu/15894138/.

The comparative analysis of the long bead sequence from Magoro Hill, South Africa, sheds new light on changing patterns in the availability, range, consumption, and origin of glass trade beads imported into the northern interior of South Africa over a period of about a thousand years.

Kolesnychenko, Anzhelika and Oleg Yatsuk

2021 виробництво скла чи його обробка? Ягорлицьке поселення у світлі нових досліджень [Glassmaking or Glassworking? Yahorlyk Settlement in the Light of Recent Research]. *Eminak* 33(1):144-156; https://www.academia.edu/93592824/.

Reports the results of various compositional analyses performed on glass beads recovered from a workshop dating to the 6th century BC in the Southern Ukraine. English summary.

Koroleva, E.P. and A.N. Egor'kov

2017 Типология и состав стекла бус курганного могильника Восход [Typology and Chemical Composition of Glass Beads from the Voskhod Burial Mound]. *Transactions of the Institute for the History of Material Culture* 16:138-145.

Optical emission spectrography of glass beads found at a site in east-central Belarus that was occupied during the late 10th and early 11th century revealed three glass types: that manufactured with 1) halophytic ash, 2) natural natron, and 3) lead.

Košta, J., K. Tomková, V. Hulínský, and J. Zavřel

2011 G-korály v raně středověkých náhrdelnících z Čech v kontextu evropské sklářské produkce přelomu 9. a 10. století [G-Beads on Early Medieval Necklaces from Bohemia in the Context of European Glass Production at the Turn of the 10th Century]. *Archeologické rozhledy* 63:586-607.

Using visual observations and chemical analyses, it is possible to distinguish a separate type of Early Medieval glass bead designated "G-beads" on their composition. Finds of these beads are typical for the horizon of Early Medieval burial sites in Bohemia. In Czech with English summary. Czechia.

Kostov, Ruslan I.

2010 Gem Minerals and Materials from the Neolithic and Chalcolithic Periods of Bulgaria and their Impact on the History of Gemmology. In *Proceedings. XIX Congress of the Carpathian-Balkan Geological Association, September 23-25, 2010, Thessaloniki, Greece*, edited by G. Christofides, N. Kantiranis, D.S. Kostopoulos, and A.A. Chatzipetros, pp. 391-397. Aristotle University of Thessaloniki, Faculty of Science, Special Volume 100.

Archaeomineralogical studies of prehistoric artifacts from the territory of Bulgaria reveal a variety of decorative minerals and materials such as nephrite, malachite, serpentinite, turquoise, jadeite, coal (jet), carnelian, agate, and jasper (including heliotrope), all of which have been used to produce beads.

Kovacevich, Brigitte, Hector Neff, and Ronald L. Bishop

2005 Laser Ablation ICP-MS Chemical Characterization of Jade from a Jade Workshop in Cancuen, Guatemala. In *Laser Ablation ICP-MS in Archaeological Research,* edited by Robert J. Speakman and Hector Neff, pp. 39-58. University of New Mexico Press, Albuquerque.

Reports on the analysis of jade objects (including several beads) from a Classic Maya site.

Kozáková, Romana, Viktoria Čisťakova, and Ing. Šárka Jonášová

n.d. Průzkum chemického složení skleněných korálků z fondu doby halštatské Národního muzea. https://www.academia.edu/33129345/.

Poster on the chemical composition of 13 monochrome and polychrome beads selected from the Hallstatt collections of the National Museum, Prague, Czechia.

Kristmanson, Helen, Erin Montgomery, Karlis Karklins, and Adelphine Bonneau

2020 The Beads from an 18th-century Acadian Site, Prince Edward Island, Canada. *Beads: Journal of the Society of Bead Researchers* 32:70-83; https://www.academia.edu/45342959/.

Among the glass and bone specimens are black beads decorated with undulating yellow lines around the middle, commonly called "rattlesnake" beads. Semi-quantitative analysis (SEM-EDS) revealed that they are not typical "black" glass but formed by melting an igneous rock called "proterobas" to form a totally opaque black glass, indicating an origin in the Fichtelgebirge region of northeastern Bavaria. This is the first recorded instance of proterobas beads in North America.

Křížová, Šárka, Natalie Venclová, Tomá Vaculovič, and Veronika Dillingerová

2020 Multi-Analytical Approach and Microstructural Characterization of Glasses from the Celtic Oppidum of Třísov, Czech Republic, Second to First Centuries BC. *Archaeological and Anthropological Sciences* 12: art. 17; https://www.academia.edu/48950536/.

All samples of the La Tène ring beads were found to be made of natron-based glass, comparable with glass produced in the Syro-Palestinian area.

Krueger, I. and K.H. Wedepohl

2003 Composition and Shapes of Glass of the Early Medieval Period (8th to 10th Century AD) in Central Europe. In *Echanges et commerce du verre dans le monde antique. Actes du colloque de l'AFAV, Aix-en-Provence Marseille 7-9 juin 2001*, edited by D. Foy and M.D. Nenna, pp. 93-100. Monographie Instrumentum 24.

Kuhn, E. Elora H., MinJoo Choi, Elizabeth Wuellner, Lisa R. Brody, and Ellery Frahm

2023 Establishing the Baltic Origins of Archaeological Amber Beads from Dura-Europos (Syria) Using Non-Destructive DRIFTS. *Journal of Archaeological Science: Reports* 49,103938; https://www.academia.edu/99271448/.

Results of the Diffuse Reflectance Infrared Spectroscopy (DRIFTS) analysis of the amber beads indicate a previously unestablished connection between Dura-Europos and northern Europe during the first two centuries CE through long-distance exchange networks stemming from the Mediterranean basin.

Kwiatkowska, Katarzyna and Dariusz Manasterski

2016 Model wieloaspektowej analizy artefaktów bursztynowych z przełomu neolitu i epoki brązu na przykładzie wybranych zabytków z Podlasia i Mazowsza [Model of a Multi-Aspect Analysis of Amber Artefacts from the Late Neolithic and the Early Bronze Age on the Basis of Selected Artifacts from Podlachia and Mazovia]. In *Studia i Materiały do Badań nad Neolitem i Wczesną Epoką Brązu na Mazows zu i Podlasiu* VI, edited by Ryszard F. Mazurowski, Dariusz Manasterski, and Katarzyna Januszek, pp. 23-51. Instytut Archeologii Uniwersytetu Warszawskiego, Warsaw.

Analysis of several amber beads and pendants from two sites in Poland was conducted to determine the type of raw material, its source, and the technology involved in their manufacture. In Polish with substantial English abstract.

Kwok, Fanny

1998 Instrumental Neutron Activation Analysis of Seventeenth Century Red Glass Beads. M.A. thesis. Department of Chemical Engineering, University of Toronto.

This study attempts to identify trading activity between the Dutch and the Ontario Petuns and New York Iroquois based on the INAA analysis of 124 red beads from archaeological contexts in Amsterdam, Ontario, and New York.

Kwon, Yoon-mi, Gyu-ho Kim, and Yong-min Shin

2007 Archeological Chemical analysis and Characteristic Investigation on Glass Beads Excavated in Sacheon Neukdo Island, Gyeongsangnam-do. *Journal of Archaeological Science* 20:105-117; https://www.e-jcs.org/journal/view.php?number=260.

Discusses the chemical properties of blue and white glass beads from a site in South Korea.

Lababidi, Lesley, Abidemi Babatunde Babalola, Bernard Gratuze, Joëlle Rolland, Emmanuel Véron, and Aurélien Canizares

2022 The Making of *Bikini* Glass in Bida, Nigeria: Ethnography, Chemical Composition, and Archaeology. *African Archaeological Review* 40(2):397-424; https://www.academia.edu/93464609/.

Analysis of raw glass and beads made by Masagá glassmakers provides new compositional and technological data for the history of glass and its techniques.

Laffoon, Jason E., Reniel Rodríguez Ramos, Luis Chanlatte Baik, Yvonne Narganes Storde, Miguel Rodríguez Lopez, Gareth R. Davies, and Corinne L. Hofman

2014 Long-Distance Exchange in the Precolonial Circum-Caribbean: A Multi-Isotope Study of Animal Tooth Pendants from Puerto Rico. *Journal of Anthropological Archaeology* 35:220-233; https://www.academia.edu/8579404/.

Explores the feasibility of using combined strontium and oxygen isotope analyses of culturally modified teeth (pendants) of animals such as the jaguar, peccary, and tapir that are not native to the Antilles to determine their geographic origins.

Lambert, Joseph B., Suzanne C. Johnson, Robert T. Parkhurst, and Bennet Bronson

1996 Analysis of Ninth Century Thai Glass. In *Archaeological Chemistry: Organic, Inorganic, and Biochemical Analysis,* edited by Mary Virginia Orna, pp. 12-22. American Chemical Society, Washington.

Samples from two sites in Thailand were analyzed for 17 elements. Most have a mixed-alkali matrix. Cluster analysis of single-color groups suggests that the people of the sites were of different origin or culture.

Lankton, James W.

2004 Using Compositional Data to Investigate the Characteristics of, and Relationships between, Four Mid-First Millennium CE Southeast Asia Glass Bead Making Traditions. M.Sc. dissertation. Institute of Archaeology, University College London.

A detailed technical study of four groups of larger glass beads from eastern Java: Bird-Star, translucent hexagonal bicone, opaque monochrome, and Jatim. Complex patterns of manufacture and trade are indicated despite the relative lack of good dated evidence.

n.d. Scientific Study of Indian Glass: Past, Present and Future. http://www.tifr.res.in/~archaeo/FOP/FoP%20papers/scientific%20study%20of%20Indian%20glass.pdf, accessed 18 January 2014.

Reviews the most important glass chemical compositional groups found at archaeological sites in India, with passing reference to when and where these glasses might have been made. The findings are primarily based on the analysis of beads.

Lankton, James W., Ch. Amartuvshin, B. Gratuze, and W. Honeychurch

2012 Glass and Faience Beads and Pendants from Middle Gobi Xiongnu Burials: New Insight from LA-ICP-MS Chemical Analyses. In *Ancient Cultures of Mongolia and Baikalian Siberia*, edited by D. Tumen, M. Erdene, and E. Mijiddorj, pp. 683-694. National University of Mongolia, Ulaanbatuur.

Lankton, James W. and Laure Dussubieux

2013 Early Glass in Southeast Asia. In *Modern Methods for Analysing Archaeological and Historical Glass, Vol. I,* edited by Koen Janssens, pp. 415-443. Wiley Online Library.

The archaeological glasses found in Southeast Asia are discussed on the basis of 1,500 chemical analyses, including beads, mostly obtained with LA-ICP-MS. Thailand, Malaysia, and Cambodia.

Lankton, James W., L. Dussubieux, and B. Gratuze

2006 Glass from Khao Sam Kaeo: Transferred Technology for an Early Southeast Asian Exchange Network. In *Recent Advances in the Archaeology of Exchange in the Upper Thai-Malay Peninsula*, pp. 317-351. *Bulletin de l'Ecole Française d'Extrême-Orient* 93.

Beads are among the items studied. Thailand.

Lankton, James W., Laure Dussubieux, and Thilo Rehren

2008 A Study of Mid-First Millennium CE Southeast Asian Specialized Glass Beadmaking Traditions. In *Interpreting Southeast Asia's Past: Monument, Image, and Text,* edited by Elisabeth Bacus, Ian C. Glover, and Peter D. Sharrock, pp. 335-356. NUS Press, Singapore. https://www.academia.edu/22146727/.

Concentrates on the chemical composition of bird star, hexagonal bicone, opaque monochrome, and Jatim glass beads.

Lankton, James W., B. Gratuze, G.-H. Kim, and L. Dussubieux

2010 Silk Road Glass in Ancient Silla: The Contribution of Chemical Compositional Analysis. In *Glass Along the Silk Road from 200 BC to 1000 AD,* edited by B. Zorn, pp. 221-237. Römisch-Germanisches Zentralmuseum, Tagungen 9.

Glass beads were included in the study. Korea.

Lankton, James W., O.A. Ige, and T. Rehren

2006 Early Primary Glass Production in Southern Nigeria. *Journal of African Archaeology* 4(1):111-138.

Fragmentary glass-working crucibles, drawn glass beads, and ritual glass objects (*aje ileke*) from Ile-Ife, southwestern Nigeria, were analyzed using scanning electron microscopy (SEM-EDS), electron probe microanalysis (EPMA), and X-ray fluorescence (XRF).

Larson, Katherine A. and Laure Dussubieux

2022 Elemental Composition of Glass Beads from the Eastern Mediterranean Region: Chronology and Provenance of Material from Tel Anafa, Israel. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 347-364. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.22.

The Anafa analysis project is one of the first comprehensive, large-sample, scientific studies of glass beads from a site of the Hellenistic period in the eastern Mediterranean.

Latinis, K.

2004 Prei Khmeng Glass Beads Preliminary EDXRF Report. In *Mission Archéologique Franco-Khmère sur l'aménagement du territoire Angkorien* (Campagne 2004), pp. 108-130. École française d'Extrême-Orient, Paris.

Law, Randall

2017 Non-Destructive Identification and Characterization of Ancient Beads: A Case Study from Harappa. In *Stone Beads of South and Southeast Asia: Archaeology, Ethnography and Global Connections*, edited by Alok Kumar Kanungo, pp. 401-408. Indian Institute of Technology Gandhinagar.

Reveals how X-ray diffraction (XRD) analysis of a small red bead believed to be glass proved it was actually made from indurated hematitic kaolinite.

Law, Randall and James H. Burton

2008 Nondestructive Pb Isotope Sampling and Analysis of Archaeological Silver Using EDTA and ICP-MS. *American Laboratory* September.

Discusses the results of the analysis of silver beads from Mohenjo-daro and Alladino in Pakistan and the possible origins of the silver.

Law, Randall, Alison Carter, Kuldeep Bhan, Arun Malik, and Michael D. Glascock

2013 INAA of Agate Sources and Artifacts from the Indus, Helmand, and Thailand Regions. In *South Asian Archaeology 2007, Vol. I: Prehistoric Periods,* edited by Dennys Frenez and Maurizio Tosi, pp. 177-184. BAR International Series 2454. https://www.academia.edu/355169/.

The study includes a set of carnelian beads of unknown archaeological provenience.

Lee, Insook

2009 Characteristics of Early Glasses in Ancient Korea with Respect to Asia's Maritime Bead Trade. In *Ancient Glass Research Along the Silk Road*, edited by Fuxi Gan, Robert Brill, and Tian Shouyun, pp. 183-189. World Scientific, Singapore.

Summarizes the types of glass utilized and discusses several distinctive bead types/forms.

Lee, Insook, R.H. Brill, and P. Fenn

1993 Chemical Analyses of Some Ancient Glasses from Korea. *Annales du 12^{e} Congres de l'Association Internationale pour l'Histoire du Verre, Vienne, 26-31 aout 1991,* pp. 163-174. Amsterdam.

Reports on the quantitative chemical analysis of 27 glass specimens, mostly beads, from archaeological contexts dating from the 1st century BC to the 7th century AD.

Lee, Insook and M.T. Wypyski

2002 Comparison of Prehistoric Glass Beads from Korea and Thailand. *Man and Environment* 27(1):161-164.

Presents evidence of contact between the eastern Indian Ocean region and Iron Age Korea through microprobe analyses of 18 glass trade beads.

Lee, Min-hee, Na-young Kim, and Gyu-ho Kim

2017 Changing Process of the Glass Beads from Osan Sucheong Site in Gyeonggi do, Korea. *Journal of Conservation Science* 33(5):331-344; https://doi.org/10.12654/JCS.2017.33.5.02.

Reporns the chemical composition of beads of the 4th century representing ten color groups. In Korean with English summary.

Lefranc, Philippe, Rose-Marie Arbogast, Fanny Chenal, Erwin Hildbrand, Matthias Merkl, Christian Strahm, Samuel Van Willigen, and Marie Wörle

2012 Inhumations, dépôts d'animaux et perles en cuivre du IV e millénaire sur le site Néolithique récent de Colmar « Aérodrome » (Haut-Rhin). *Bulletin de la Société préhistorique française* 109(4):689-730.

Two necklaces composed of copper beads were found with a Neolithic burial in northeastern France. Compositional data are provided.

Leventhal, Alan and Rosemary Cambra

2011 The Dating and Chronological Placement of the Clareño Muwékma Ya Túnnešte Nómmo [Where the Clareño Indians are Buried] Site (CA-SCL-30/H). In *Final Report on the Burial and Archaeological Data Recovery Program Conducted on a Portion of the Mission Santa Clara Indian Neophyte Cemetery (1781-1818): Clareño Muwékma Ya Túnnešte Nómmo [Where the Clareño Indians are Buried] Site (CA-SCL-30/H), Located in the City of Santa Clara, Santa Clara County, California,* edited by Alan Leventhal, Diane DiGiuseppe, et al., pp. 9.1-9.9. Sanford University, Sanford.

A small amount of human bone from two of the burials and a sample of Type H series disk *Olivella* shell beads were subjected to Accelerator Mass Spectrometry (AMS) dating. The results corroborate the 1781-1818 date for the inhumations. Also discusses previously dated Type H series beads from CA-SCL-30/H, and describes all the shell beads recovered from the site.

Li, Fei, Qinghui Li, Fuxi Gan, Bin Zhang, and Huansheng Cheng

2005 Chemical Composition Analysis for Some Ancient Chinese Glasses by Proton Induced X-Ray Emission Technique. *Journal of the Chinese Ceramic Society* 5:581-586.

Reports on the composition of faience and glass beads of the Han, Yuan, and Northern Wei dynasties unearthed from the Neimenggu area and Boshan, China. In Chinese.

Li, Fei, Qinghui Li, Fuxi Gan, Bin Zhang, Huansheng Cheng, and Shifang Shen

2007 Analysis of Some Ancient Glass Samples Unearthed in Sichuan Area by PIXE. *Nuclear Techniques* 2.

The proton induced X-ray emission (PIXE) technique was used to determine the composition of glass beads and other objects dating from the Warring States Period (770-476 BC) to the Six Dynasties Period (220-589 AD). In Chinese.

Li, Qinghui, Junqing Dong, Bomin Su, Gangquan Chen, Song Liu, and Donghong Gu

2013 Non-Destructive Analysis of the Warring States Glass Beads Unearthed from Jingzhou, Hubei by pXRF and Discussions on Relative Issues. *Dunhuang Research* 1.

The glass samples could be divided into two glass groups: PbO-BaO-SiO_2 and Na_2O-CaO-SiO_2. China. In Chimese.

Li, Qinghui, JiaoZhen Huang, and Fuxi Gan

2006 A Report of the Analysis of the Chemical Composition of Some Glass Artifacts from the Warring States Period. *Sciences of Conservation and Archaeology* 2.

The samples include monochromatic glass beads and compound eye beads and represent three kinds of glass (Na_2O-CaO-SiO_2, K_2O-SiO_2, and PbO-BaO-SiO_2) that coexisted in Xinjiang, China, during the Warring States period. In Chinese.

Li, Qinghui, Song Liu, Bomin Su, Hongxia Zhao, Qiang Fu, and Junqing Dong

2013 Characterization of Some Tin-Contained Ancient Glass Beads Found in China by Means of SEM-EDS and Raman Spectroscopy. *Microscopy Research and Technique* 76:133-140; https://www.academia.edu/4303352/.

The beads, dating from 1st century BC to the 10th century AD, were excavated in the Xinjiang and Guangxi provinces of China. Two kinds of tin-based opacifiers/colorants including crystalline cassiterite and lead-tin yellow types II were first found in these soda-lime beads.

Li, Qinghui, S. Liu, H.X. Zhao, F.X. Gan, and P. Zhang

2014 Characterization of Some Ancient Glass Beads Unearthed from the Kizil Reservoir and Wanquan Cemeteries in Xinjiang, China. *Archaeometry* 56(4):601-624; https://doi.org/10.1111/arcm.12031.

At least two different types of glass were present in the two cemeteries. For the first time, antimony-based colorant/opacifier was systematically identified in some beads of plant-ash type soda-lime glass dated to about 1000-500 BC. The limited number of potash glass beads from the Kizil reservoir cemetery, which were dated to about 500-300 BC, used tin oxide as an opacifier.

Li, Qinghui, J.C. Yang, L. Li, J.Q. Dong, H.X. Zhao, and S. Liu

2015 Identification of the Man-Made Barium Copper Silicate Pigments among Some Ancient Chinese Artifacts Through Spectroscopic Analysis. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy* 138:609-616.

Most of the specimens tested were glazed polychrome pottery beads dating from the 4th century BC to the 3rd century AD. They are composed of vitreous PbO-BaO-SiO_2 material.

Li, Qinghui, Hongzhi Zhou, Jiaozhen Huang, Fuxi Gan, and Ping Zhang

2005 Yipi zhongguo gudai xiangqian bolizhu huaxue chengfen fenxi de jiance baogao (Chemical Composition Analytic Results of Ancient Chinese Compound Eye Beads). *Jianghan kaogu* (Jianghan Archaeology) 4.

The beads were unearthed at Xinjiang, Hubei, Sichuan, and Guangdong, China. In Chinese.

Liang, Haida, Margaret Sax, and David Saunders

2012 Microstructure of Laboratory Replicates of Ancient Egyptian Faience: A New Investigation with Optical Coherence Tomography. *Lacona* IX:84-88; https://www.academia.edu/44744063/.

The non-invasive nature of OCT and its speed of acquisition make it possible to image the subsurface microstructure of large volumes of objects such as faience beads to yield an overview of the microstructure associated with each specific production technique.

Lībiete, Jana and Indra Tuņa

2000 Conservation of the Daugmale Castle-Mound Beads. www.kanut.ee/toimetised/konverentsid/consasinvest/libiete.rtf, accessed 13 June 2015.

Not only discusses the conservation process for the recovered beads but also provides information on the chemical composition of 10 of them. The site is located in Latvia and the beads date mostly to the 10th-17th centuries.

Likhter, Julia A.

2017 Imported Beads in Russia in the 17th and First Half of the 18th Centuries (Moscow, Mangazeya, Smolensk Region). *Annales du 20e Congrès de l'Association Internationale pour l'Histoire du Verre, Fribourg / Romont 7-11 septembre 2015*, pp. 585-590; https://aihv.org/publications/annales-20/.

Discusses the beads recovered from excavations in Moscow; Mangazeya, a trade settlement founded in the 1570s in northwestern Siberia; and Volochyok Vyazemskiy, an Old Russian hill fort of the late 17th-18th centuries. Includes information concerning glass composition.

Likhter, Julia A., Alexander G. Veksler, Nikolay I. Sudarev

2015 Traces of Glass Bead Production in 18th Century Moscow. *Annales du 19e Congrès de l'Association Internationale pour l'Histoire du Verre, Piran 2012,* pp. 512-518; https://aihv.org/publications/annales-19/.

Reports on a workshop which produced wound beads. Composition analysis shows the presence of two chemical types of glass: K-Ca-Pb-Si, and K-Ca-Si.

Lilyquist, C. and R.H. Brill

1993 *Studies in Early Egyptian Glass.* Metropolitan Museum of Art, New York.

Compositional analyses and discussion include some beads and provide important evidence for Egyptian relations with the Near East and Mesopotamia. The material is believed to come from the tomb of three foreign wives of Tuthmosis III (ca. 1479-1425 BC).

Lin, Yi-Xian, Thilo Rehren, Hui Wang, Xiao-Yan Ren, and Jian Ma

2019 The Beginning of Faience in China: A Review and New Evidence. *Journal of Archaeological Science* 105:97-115.

Combines published and new results of chemical analysis, morphology, and chronology of the earliest faience beads uncovered from Xinjiang, Qinghai, Gansu, Shaanxi, and Shanxi in China to determine how, where, and by whom this technology began. *See* Yang (2020) for a comment.

Linares Catela, José Antonio and Carlos Patricio Odriozola Lloret

2011 Cuentas de collar de variscita y otras piedras verdes en tumbas megalíticas del Suroeste de la Península Ibérica. Cuestiones acerca de su producción, circulación y presencia en contextos funerarios. In *Explorando el tiempo y la materia en los monumentos prehistóricos: cronología absoluta y rocas raras en los megalitos europeos*, edited by L. García Sanjuán, C. Scarre, and D. Weathley, pp. 335-369. *Menga: Revista de Prehistoria de Andalucía* 1.

Investigates the production, distribution, and presence in funerary contexts of necklace beads made from variscite and other green stones in megalithic tombs in the southwest of the Iberian peninsula. Includes compositional analysis.

Liou, Ying San and Yi Chang Liu

2017 Micro-Raman Spectroscopy and μ-XRF in the Investigation of Ancient Glass Beads from the Archaeological Sites, Eastern Taiwan. *Geophysical Research Abstracts* 19; http://meetingorganizer.copernicus.org/EGU2017/EGU2017-10853.pdf.

Provides a summary of the findings. The beads date to ca. 1850-310 BP.

Liou, Ying-San, Shih-Chung Wang, and Yi-Chang Liu

2014 Preliminary Scientific Results of the Ancient Glass Beads Unearthed from the Chungde Site, Hualien. *National Taiwan Museum Studies Journal* 67(1):53-69. http://www.ntm.gov.tw/upload/education/book/20140415/822d4ed8-c1f0-4bd7-9439-a2325204db05.pdf, accessed 13 December 2014.

Micro-Raman spectroscopy, μXRF, and XPS analysis are used in combination to examine ten ancient glass beads excavated from the Chungde site, Hualien, Taiwan, dated back to 1500-1800 BP, to determine the mineralogical and chemical compositions.

Lisowska, Ewa, Kinga Zamelska-Monczak, Justyna Kolenda, Piotr Gunia, and Barbara Łydżba-Kopczyńska

2017 Multidisciplinary Approach to the Provenance Investigations of Early Medieval Amber Finds Discovered in Santok and Milicz. *Fontes Archaeologici Posnanienses* 53:223-240.

Presents the first multidisciplinary provenance study of archaeological amber objects – beads and a pendant included – dated to the period of the Middle Ages in Poland.

Liu, Nian, Yimin Yang, Yongqiang Wang, Wanglin Hu, Xiaochenyang Jiang, Meng Ren, Min Yang, and Changsui Wang

2017 Nondestructive Characterization of Ancient Faience Beads Unearthed from Ya'er Cemetery in Xinjiang, Early Iron Age China. *Ceramics International* 43(13):10460-10467.

The beads are the earliest (1050-300 BCE) faience artifacts uncovered in China to date. Two glazing methods – direct application and efflorescence – were used in their production. Their chemistry suggests they come from the West. Thus, it is suggested that there was a faience road from Western Asia through Xinjiang to central China about 3,000 years ago.

Liu, S., Q.H. Li, Q. Fu, F.X. Gan, and Z.M. Xiong

2013 Application of a portable XRF spectrometer for classification of potash glass beads unearthed from tombs of Han Dynasty in Guangxi, China. *X-Ray Spectrometry* 42(6):470-479.

Reports on the composition of 37 glass beads excavated from Han Dynasty tombs in Hepu county, Guangxi, China.

Liu, S., Q.H. Li, F. Gan, P. Zhang, and J.W. Lankton

2012 Silk Road Glass in Xinjiang, China: Chemical Compositional Analysis and Interpretation Using a High-Resolution Portable XRF Spectrometer. *Journal of Archaeological Science* 39(7):2128-2142; https://www.academia.edu/22325607/.

Explores the chemistry of 65 glass beads from 18 oasis sites both north and south of the Taklamakan Desert, the ancient center of the Silk Routes linking East and West. The samples date from the Warring States period (475-2211 BC) to the Tang dynasty (AD 618-907).

Liu, Yan, Jianjun Yu, Junchang Yang , and Wenying Li

2021 Long-Distance Relationship with the Mediterranean World? Gold Beech-Nut Pendants Found in the Early Iron Age China and the Eurasian Steppe. *Mediterranean Archaeology and Archaeometry.* 21(2):259-280; https://www.academia.edu/51097652/.

Presents a micro-analytical study of an array of gold pendants excavated from the burial site at Dongtalede (9th-7th centuries BCE) in the Altai region of Xinjiang, northwestern China. Includes information re: chemical composition and manufacturing techniques.

Loendorf, Chris and Craig M. Fertelmes

2013 Shell, Stone, and Ceramic Beads EDXRF Analysis. In *Research Study Proposals: Five Energy Dispersive X-Ray Fluorescence Analyses of Archaeological Remains from the Gila River Indian Community, Pima-Maricopa Irrigation Project,* edited by Chris Loendorf, Craig M. Fertelmes, Chris Garraty, and Daniel Dybowski, pp. 38-40. Material Science Laboratory, Gila River Indian Community, Cultural Resource Management Program, Sacaton, Arizona. pXRF Technical Report 2013-02, P-MIP Technical Report 2013-01.

Loewen, Brad and Laure Dussubieux

2021 The Chemistry of Nueva Cadiz and Associated Beads: Technology and Provenience. *Beads: Journal of the Society of Bead Researchers* 33: 64-85; https://www.academia.edu/66152700/.

LA-ICP-MS analysis of Nueva Cadiz beads from the namesake site in Venezuela and those collected from an unknown site or sites near Tiahuanaco, Bolivia, provides chemical compositions of their glasses. There are chemical similarities with glasses made in Venice, identifying it as a candidate to consider when searching for the origin of Nueva Cadiz beads.

Lonçarić, Valentina and Mafalda Costa

2023 Known Glass Compositions in Iron Age Europe – Current Synthesis and Emerging Questions. *Heritage* 6:3835-3863; https://www.researchgate.net/publication/370234751.

Reviews the current state of research into Iron Age (1st millennium BCE) glasses in Europe by examining the available published data on glass compositions to critically assess some practical and theoretical issues stemming from this heterogenous field of research. Key questions are addressed, and future lanes of research are proposed. Beads enter into the discussion.

López, Gabriel E.J., Juan P. Orsi, Sonia Araya, Silvina Seguí, Mariana Rosenbusch, and Patricia Solá

2020 Ocupación incaica en Cueva Inca Viejo y Abra de Minas, Puna de Salta, Argentina. Minería de turquesa y prácticas rituales. *Estudios Atacameños* 66:49-82; https://www.academia.edu/50017001/.

Cueva Inca Viejo is the first documented source with evidence of turquoise beadmaking in prehispanic contexts in northwestern Argentina. SEM-EDX and XRD analysis provides compositional data.

López, Mariel Alejandra

2010 Análisis arqueométrico de las cuentas de vidrio de Pintoscayoc 1, Quebrada de Humahuaca, Jujuy, Argentina. In *La Arqueometría en Argentina y Latinoamérica*, edited by S. Bertolino, R. Cattáneo, and A. Izeta, pp. 373-378. Editorial de la Facultad de Filosofía y Humanidades, Universidad Nacional de Córdoba.

Investigates the composition of corroded glass beads recovered from a site in northwestern Argentina that dates to the 16th-17th centuries.

2011 Estado de conservación y caracterización tecnológica de las cuentas de vidrio de Pintoscayoc 1, Quebrada de Humahuaca, Jujuy, Argentina. *Conserva* 16:55-68.

Reports on the archeometric analysis of glass beads found in different depositional and post-depositional conditions at a site in Argentina dated between 450 and 370 BP.

Lozada-Mendieta, Natalia, Philip Riris, and José R. Oliver

2022 Beads and Stamps in the Middle Orinoco: Archaeological Evidence for Interaction and Exchange in the Atures Rapids from AD 1000 to 1480. *Latin American Antiquity*; doi:10.1017/laq.2022.73.

Presents an archaeometric analysis of stone beads and ceramic roller stamps, items previously associated with trade practices, from two recently excavated sites in the region, Picure (AD 1030-1480) and Rabo de Cochino (AD 1000-1440); it assesses their provenance, production, and value.

Lü, Qin-Qin, Julian Henderson, Yongqiang Wang, and Binghua Wang

2021 Natron Glass Beads Reveal Proto-Silk Road between the Mediterranean and China in the 1st Millennium BCE. *Scientific Reports* 11:3537; https://www.academia.edu/45132751/; https://www.academia.edu/45132751/.

After establishing the compositional types and technological sequence of Mediterranean natron glass (8th-2nd centuries BCE) using trace elements, the authors report the analysis of a mid-1st millennium BCE glass bead from Xinjiang, China, which was likely made with Levantine raw glass, and identify common types of stratified eye beads in Eurasia based on a compositional and typological comparison.

Lü, Qin-Qin and Youjin Wu

2019 LA-ICP-MS Analysis of Corroded Glass Beads from Southern China: Tackling Highly Inhomogeneous Archaeological Glass. *STAR: Science & Technology of Archaeological Research*; https://www.academia.edu/98522684/.

Based on the analysis of three corroded Indo-Pacific beads, discusses the issues that may be involved when observing signal curves of highly inhomogeneous archaeological glass, as well as provide chemical characterization for the intact pristine body.

Luedtke, Barbara

1998 Analysis of the Copper Bead from Calf Island, Massachusetts. *North American Archaeologist* 19(2):163-171.

Presents descriptive data and results of chemical analysis of a copper bead from a late prehistoric site on an island in Boston Harbor. Includes a discussion of similar beads from other sites in the region.

Ly, Suw Young, Kyung Lee, Hyung Tae Kang, and Hai Soo Yoo

2010 Investigation of Trace Cobalt in Glass Beads from an Archaeological Tomb. *IEEE Sensors Journal* 11(6):1325-1328.

Voltammetric analysis of trace cobalt (Co) using modified carbon nanotube sensors in cyclic voltammetry (CV), square wave (SW) stripping voltammetry, and chronoamperometry modes was conducted on glass beads from an ancient tomb recently found in Sachang Dong, Cheongju City, South Korea, and dated to the 17th century (ca. Joseon period). It was found that the sensor can be used in trace analysis of archeological materials.

Lyubomirova, V., Ž. Šmit, H. Fajfar, and I. Kuleff

2014 Chemical Composition of Glass Beads from the Necropolis of *Apollonia Pontica* (5th-3rd Century BC). *Archaeologia Bulgarica* 18(2):1-17; https://www.academia.edu/30570137/.

The concentration of 25 elements in the earliest glass materials in Bulgaria is determined and discussed.

Ma, Qian, A. Mark Pollard, Yifan Yu, Zhuanjie Li, Linling Liao, Long Wang, Man Li, Luwu Cai, Li Ping, and Rui Wen

2022 Laser Ablation Inductively Coupled Plasma Mass Spectrometry Analysis of Potash and m-Na-Al Glasses in China – Using Kernel Methods for Trace Element Analysis. *Heritage Science* 10, 29; https://doi.org/10.1186/s40494-022-00651-3.

Analysis of Indo-Pacific glass beads recovered from several sites in China dating to the Warring States period and the Han dynasty (202 BC-AD 220) revealed that they were likely produced in northeastern India or Southeast Asia and exported through the Maritime Silk Road.

Macāne, Aija, Kerkko Nordqvist, and Elena Kostyleva

2019 Marmot Incisors and Bear Tooth Pendants in Volosovo Hunter-Gatherer Burials: New Radiocarbon and Stable Isotope Data from the Sakhtysh Complex, Upper-Volga Region. *Journal of Archaeological Science: Reports* 26, Article 101908; https://www.sciencedirect.com/journal/journal-of-archaeological-science-reports/vol/26/suppl/C.

Presents 15 new AMS and stable bulk isotope measurements of animal bones and teeth from ritual contexts. Russia.

Magee, R.W.

1993 Faience Beads of the Irish Bronze Age. *Archaeomaterials* 7(1):115-125.

Analyses of beads from Bronze Age Ireland to trace their affinities with beads from other parts of the British Isles.

Magnavita, Sonja

2009 Sahelian Crossroads: Some Aspects on the Iron Age Sites of Kissi, Burkina Faso. In *Crossroads/Carrefour Sahel: Cultural and Technological Developments in First Millenium BC/AD West Africa*, edited by Sonja Magnavita, Lassina Koté, Peter Breunig, and Oumarou A. Idé, pp. 79-104. Journal of African Archaeology Monograph Series 2.

Discusses the recovered beads of glass, stone, and baked clay, as well as cowries, dating to the 1st to early 2nd millenia AD. The chemical composition of the glass beads is also provided.

Magnavita, Sonja, Brandi L. MacDonald, Carlos Magnavita, and April Oga

2023 LA-ICP-MS Analysis of Glass Beads from Tié (12th-14th Centuries), Kanem, Chad: Evidence of Trans-Sudanic Exchanges. *Archaeometry*; https://doi.org/10.1111/arcm.12898.

The composition of the beads largely matches assemblages from along the East African coast, indicating that most of them entered the region via a hitherto undocumented east-west Sudanic route linking Northeast Africa with Lake Chad.

Măndescu, Dragoş, Maria Mihalache, Ioana Stănculescu, and Mihai Constantinescu

2017 Contribuţii la studiul pieselor de port şi podoabă din mediul cultural Ferigile. Mărgelele de caolin descoperite în necropola hallstattiană de la Valea Stânii (judeţul Argeş) [Contributions to the Study of the Adornments from Ferigile Cultural Milieu. The Kaolin Beads Found in the Early Iron Age Necropolis at Valea Stânii (Argeş County)]. *Peuce, Serie Nouă, Studii şi cercetări de istorie şi arheologie* XV:7-48.

The study of small kaolin beads found at a site in Romania includes compositional analysis.

Mangou, Helen

2001 Chemical Analyses of Three Opaque Glass Beads and a Sword from the Pylona Cemetery. In *The Mycenaean Cemetery at Pylona on Rhodes,* edited by Efi Karantzali, pp. 117-118. British Archaeological Reports, International Series 988.

Manning, Sturt W. and John P. Hart

2019 Radiocarbon, Bayesian Chronological Modeling and Early European Metal Circulation in the Sixteenth-Century AD Mohawk River Valley, USA. *PLoS ONE* 14(12): e0226334; https://doi.org/10.1371/journal.pone.0226334.

Bayesian chronological modeling of a large set of radiocarbon dates indicates that European iron and cuprous metals (some in the form of beads) arrived in the Mohawk River Valley of New York earlier than previously thought – by the beginning of the 16th century. Also mentions find sites of copper beads in the region.

Manrique-Ortega, M.D., P. Claes, E. Casanova-González, J. L. Ruvalcaba-Sil, Ma. A. García-Bucio1, and L. Lowe

2014 Non-Invasive Analysis of Green Stone Pieces from Tomb 1 of Chiapa de Corzo, Chiapas. In *Symposium 8A – Cultural Heritage and Archaeological Issues in Materials Science*, edited by J.L.R. Sil, J.R. Trujeque, A.V. Castro, and M.E. Pesqueira, pp. 17-29. Materials Research Society Symposium Proceedings 1618. https://www.academia.edu/28984601/.

Characterizes and identifies the minerals that compose the various green stone ornaments found with two elite burials of the Formative Period in southeastern Mexico and attempts to determine their source.

Maran, Joseph

2013 Bright as the Sun: The Appropriation of Amber Objects in Mycenaean Greece. In *Mobility, Meaning and the Transformations of Things*, edited by Hans Peter Hahn and Hadas Weiss, pp.147-169. Oxbow Books, Oxford. https://www.academia.edu/3435319/.

The contextual analysis of the appearance of amber objects (beads included) in Early Mycenaean graves points to a striking variation in how the various components were selected, combined, and deposited, thereby contradicting the hitherto predominant notion of a uniform use of such objects as necklaces.

Marchetti, Marie-Laurence and Bernard Gratuze

2007 Le mobilier en verre du site de la Grotta Piatta (Aregno, Haute-Corse): composition chimique et chronotypologie. *ArchéoSciences* 31:163-173; https://www.academia.edu/96987596/.

Analysis of glass beads excavated at Grotta Piatta, a protohistoric funerary site on the coast of Balagne, Corsica, revealed the Near-Eastern origin of the glass used as raw material.

Marín-Aguilera, Beatriz and Laure Dussubieux

2023 Embodying Ethiopia's Global Golden Age on the Muslim-Christian Frontier: The Allure of Glass Beads. *African Archaeological Review* 40(2):317-333; https://doi.org/10.1007/s10437-023-09513-0.

LA-ICP-MS analysis of glass beads recovered from Shay Culture tombs reveals how the Shay communities benefitted from the Islamic global trade routes during the 9th-14th centuries, particularly the Middle East, Egypt, and the Indo-Pacific networks.

Martin Pruvot, Chantal and Bernard Gratuze

2019 Des perles en verre d'Inde du Sud ou du Sri Lanka au bord du Léman Importations pour l'élite mérovingienne. *Kunst + Architektur in der Schweiz* 4(4); hal-02420092, version 1.

Analysis of tiny opaque green glass beads found with female burials of the Early Middle Ages at the necropolis of Clos d'Aubonne at La Tour-de-Peilz, Switzerland, reveal that they bear witness to trade between South India or Sri Lanka and the Merovingian West.

Martínez Mira, Isidro, O. Cornejo Navarro, and E. Vilaplana Ortego

2015 Anexos. Estudio arqueométrico de los elementos de adorno personal de la necrópolis de El Castillo (Castejón, Navarra). Análisis instrumental. In *Ritos funerarios en el valle medio del Ebro (s. VI-III a.C.). Necrópolis de El Castillo (Castejón, Navarra). Vol. 3. Ritos funerarios*, by José Antonio Faro Carballa, pp. 1441-1475. Ph.D. thesis. Univ. de Educ. a Distancia.

Presents the results of archaeometric analysis of several glass paste beads and seals of the 6th-4th centuries BC from a burial ground in Spain.

Martínez Mira, Isidro and Eduardo Vilaplana Ortego

2014 Análisis de las cuentas de collar de la tumba 19 de la Necrópolis de Boliche. In *La Necrópolis orientalizante de Boliche (Cuevas del Almanzora, Almería),* by Alberto J. Lorrio, pp. 235-242. Real Academia de la Historia, Madrid.

Presents information concerning the form, composition, production, dating, origin, and the cultural significance of several beads recovered from a tomb in southern Spain.

2014 Cuentas de collar de La Fonteta (Guardamar, Alicante) y La Peña Negra (Crevillente, Alicante): descripción y análisis instrumental. In *La Fonteta-2: Estudio de los materiales arquelógicos hallados en la colonia fenicia de la actual desembocadura del río Segura (Guardamar, Alicante)*, Vol. 2, edited by Alfredo González Prats, pp. 848-931. Seminarios Internacionales Sobre Temas Fenicios, Alicante.

Describes and presents compositional data for stone and faience necklace beads of the period 850-550 BC from southeastern Spain.

Martinón-Torres, Marcos, Roberto Valcárcel Rojas, Jago Cooper, and Thilo Rehren

2007 Metals, Microanalysis and Meaning: A Study of Metal Objects Excavated from the Indigenous Cemetery of El Chorro de Maíta, Cuba. *Journal of Archaeological Science* 34(2):194-204.

Discusses the composition of beads and small metal objects found with Taino burials. The items analyzed include beads made of placer gold exploited locally, gold-copper-silver pendants brought from continental South America and, above all, tubular brass lacetags from European clothing that were perceived as sacred metals.

Martinón-Torres, Marcos, Roberto Valcárcel Rojas, Juanita Sáenz Samper, and María Filomena Guerra

2012 Metallic Encounters in Cuba: The Technology, Exchange and Meaning of Metals before and after Columbus. *Journal of Anthropological Archaeology* 31:39-454; https://www.academia.edu/44720469/.

Presents the results of the first analytical program focused on metal artifacts (beads and pendants included) recovered from a range of Taíno sites in Cuba. Includes compositional analysis and observations on production processes.

Mascelloni, M.L., G. Cerichelli, and S. Ridolfi

2008 A Multi-Disciplinary Approach to the Study of an Assemblage of Copper-Based Finds Assigned to the Prehistory and Proto-History of Fucino, Abruzzo, Italy. In *Proceedings of the 37th International Symposium on Archaeometry, 13th-16th May 2008, Siena, Italy*, edited by Isabella Turbanti-Memmi, pp. 605-610. Springer.

The assemblage includes 7 beads and 1 bead/spiral.

Mathis, François, Olivier Vrielynck, Amandine Leroy, Hélène Tregouet, and David Strivay

2013 Les perles en verre de la nécropole de Bossut–Gottechain : recettes et fabrication. Paper presented at Archéométrie Caen 2013 - XIXe Colloque du GMPCA, Caen, France; https://orbi.uliege.be/handle/2268/160384.

Reports on the typo-chronology and composition of glass beads recovered from one of the largest Merovingian necropolises in Belgium.

Matthes, C., M. Heck, C. Theune, P. Hoffmann, and J. Callmer

2004 Produktionsmechanismen von frühmittelalterlichen Glasperlen. *Germania* 82(1):109-157.

Discusses the production mechanisms of early medieval glass beads. Includes data concerning their chemical composition.

Mazzieri, Paola and Roberto Micheli

2014 Tradizioni funerarie e ornamenti personali. Alcune osservazioni dalla sfera VBQ emiliana alla luce delle ultime scoperte. *Rivista di Studi Liguri* LXXVII-LXXIX:323-330.

Deals with the beads and pendants recovered from Square Mouth Vase Culture contexts in Italy.

McCabe, Kendra and William T. Billeck

2018 To Bead or Not to Bead: Composition Variation of White Glass Beads is the Question. National Museum of Natural History, Smithsonian Institution, Washington, DC. https://naturalhistory.si.edu/sites/default/files/media/file/2018-mccabe-poster.pdf.

This poster documents change in the opacifiers (tin, antimony, and arsenic) used in the production of drawn white glass beads during the 17th-19th centuries.

McCoy, T.J., A.E. Marquardt, John T. Wasson, Richard D. Ash, and Edward P. Vicenzi

2017 The Anoka, Minnesota Iron Meteorite as Parent to Hopewell Meteoritic Metal Beads from Havana, Illinois. *Journal of Archaeological Science* 81:13-22.

Delves into the composition and manufacture of the beads, as well as the source of the material.

McGovern, Patrick E.

1987 Silicate Industries of Late Bronze-Early Iron Age Palestine: Technical Interaction between Egypt and the Levant. In *Early Vitreous Materials*, edited by Mavis Bimson and Ian C. Freestone, pp. 91-114. British Museum Occasional Papers 56.

The composition of silicate beads and pendants from Beth Shan in Israel and the Baq'ah Valley of Jordan was determined to elucidate the technological innovations and interaction between different industries in the region during the Late Bronze and Early Iron ages (ca. 1550-1050 BC).

McGovern, Patrick E., Stuart J. Fleming, and Charles P. Swann

1993 The Late Bronze Egyptian Garrison at Beth Shan: Glass and Faience Production and Importation in the Late New Kingdom. *Bulletin of the American Schools of Oriental Research* 290/291:1-27.

Analyses of a limited corpus of Egyptian silicate artifacts (including beads) from the 18th to the 20th Dynasty shown that the batch recipes and colorants of the el-Amarna group, except for cobalt blue, are very distinct chemically from glasses and glazes produced a century later at other Egyptian sites.

McIntosh, Susan Keech, Marilee Wood, Laure Dussubieux, Peter Robertshaw, Timothy Insoll, and Mamadou Cissé

2020 Glass Beads from Medieval Gao (Mali): New Analytical Data on Chronology, Sources, and Trade. *Journal of African Archaeology*; https://www.academia.edu/43403866/.

Reports on the results of compositional analysis by LA-ICP-MS of 100 glass beads recovered from several archaeological sites in and around Gao dating to the 8th-14th centuries.

Mecking, Oliver

2015 Naturwissenschaftliche Untersuchungen zu den Silberfunden und Glasperlen aus Oberwellenborn, Lkr. Saalfeld-Rudolstadt [Scientific Studies on the Silver Finds and Beads from Oberwellenborn, Saalfeld-Rudolstadt District] *Alt-Thüringen* 44:217-224; https://www.academia.edu/20353400/.

On the chemical composition of metal-foil beads found in Germany.

Medici, Teresa, Giulia Foradori, Francesco Carrer, Roberto Dal Maschio, Stefano Gialanella, Maurizio Montagna, Annaluisa Pedrotti, and Diego E. Angelucci

2014 Una perlina in vetro da un contesto pastorale d'alta quota della Val di Sole (Trento). In *Il vetro in età protostorica in Italia, Atti delle XVI Giornate Nazionali di Studio sul Vetro*, edited by Silvia Ciappi, Annamaria Larese, and Marina Ubold, pp. 115-124. Comitato

Nazionale Italiano, Association Internationale pour l'Histoire du Verre, Venice. https://www.academia.ed
Discusses a "gooseberry" glass bead attributed to the 16th-18th centuries from a high-altitude pastoral context at Trento, Italy. Includes chemical analysis.

Meek, Andrew, Nikolai N. Nikolaev, and St John Simpson

2021 Scientific Analyses of Some Glass Beads from Scythian and Later Sites in Southern Siberia. In *Masters of the Steppe: The Impact of the Scythians and Later Nomad Societies of Eurasia: Proceedings of a Conference Held at the British Museum, 27-29 October 2017*, edited by Svetlana V. Pankova and St John Simpson, pp. 296-301. Archaeopress, Oxford. https://www.academia.edu/44959551/.

Advances in archaeological science now allow a better understanding of the sources of the materials used to make beads and therefore offer a new way of analyzing ancient circulation patterns and appreciating the true significance of these tiny objects.

Meek, Andrew and Sonja Marzinzik

2015 The Discovery of Cobalt Colourant Raw Materials as Inclusions within Anglo-Saxon Glass Beads. *Annales du 19e Congrès de l'Association Internationale pour l'Histoire du Verre, Piran 2012,* pp. 376-380.

Melgar Tísoc, Emiliano R. and José Luis Ruvalcaba

2014 Technological Analysis of the Calcite Beads from the Great Temple of Tenochtitlan. *MRS Proceedings* 1618:97-107.

Analysis of several green calcite beads reveals similarities to Huastec pieces, both at mineralogical and technological levels. It is proposed that these pieces could be objects looted during the Aztec campaigns against Huastec sites.

Melgar Tísoc, Emiliano R., José Luis Ruvalcaba, Kilian Laclavetine, and Estela Martínez Mora

2014 Procedencia y manufactura de las turquesas de Pajones, el Bajío y Cerro Moctehuma, Chalchihuites, Zacatecas. *Tiempo y región. Estudios históricos y sociales* VII:191-221.

On the origin and manufacture of turquoise objects (including beads and pendants) from central Mexico.

Melgar Tísoc, Emiliano R. and Reyna Beatriz Solís Ciriaco

2018 Caracterizacion mineralogica y tecnologica de lapidaria de Teopancazco. In *Teopancazco como centro de barrio multiétnico de Teotihuacan. Los sectores funcionales y el intercambio a larga distancia*, edited by Linda R. Manzanilla, pp. 621-672. Universidad Nacional Autónoma de México, México DF. https://www.academia.edu/37891704/.

Reports on the chemical analysis and manufacturing techniques of stone ornaments recovered from a neighborhood of Teotihuacan, central Mexico.

Melgar, Emiliano, Reyna Solís, and José Luis Ruvalcaba

2012 La lapidaria de Teopancazco: composición y manufactura. In *Estudios arqueométricos del centro de barrio de Teopancazco en Teotihuacan,* edited by Linda Rosa Manzanilla, pp. 257-284. Universidad Nacional Autónoma de México, México DF. https://www.academia.edu/13293578/.

Reports on the composition and production technology used to produce greenstone beads, pendants, and other ornaments recovered from the Teopancazco area of Teotihuacan, Mexico.

2012 Technological and Material Characterization of Lapidary Artifacts from Tamtoc Archaeological Site, Mexico. *Materials Research Society Symposium Proceedings* 1374:103-114; https://www.academia.edu/8019650/.

The aim of this work is to measure the composition of the recovered stone beads and other artifacts for provenance study and to establish the manufacturing technique and tools used to produce them.

Meyer, Carol, Joan M. Todd, and Curt W. Beck

1991 From Zanzibar to Zagros: A Copal Pendant from Eshnunna. *Journal of Near Eastern Studies* 50(4):289-298; https://www.academia.edu/73182932/.

Compositional analysis of a small pendant recovered from a grave near the Northern Palace at Tell Asmar, ancient Eshnunna, Iraq, and dated as "Protoimperial" (ca. 2500-2400 BC), revealed that it is copal and not amber, as formerly believed. More specifically, a copal from the Zanzibar, Madagascar, Mozambique region of East Africa.

Michelaki, Kostalena, Ronald G.V. Hancock, Gary Warrick, and Dean H. Knight

2013 17th Century Huron Village Life: Insights from the Copper-Based Metals of the Ball Site, Southern Ontario, Canada. *Journal of Archaeological Science* 40(2):1250-1259; https://www.academia.edu/1985643/.

Over 400 yellow-metal samples (including several beads and pendants) were analyzed using INAA to determine the number of kettles that had reached the village, explore the chronology of their arrival, and examine patterns in their discard within the site.

Micheli, Roberto

2014 Ornamenti personali e gruppi neolitici: elementi di differenziazione culturale nell'ambito della cultura dei Vasi a Bocca Quadrata. *Rivista di Studi Liguri* LXXVII-LXXIX:235-242.

On beads and pendants recovered from Square Mouth Vase Culture contexts in Italy.

Micheli, Roberto and Federico Bernardini

2018 Ornamenti personali in conchiglia di *Spondylus* : applicazione sperimentale dell'analisi microCT per la determinazione del genere. Potenzialità e limiti del metodo [Personal *Spondylus* Shell Ornaments: Experimental Application of MicroCT Analysis for Genus Determination. Potential Impact and Limits of the Method]. In *Preistoria e Protostoria*

del Caput Adriae, edited Elisabetta Borgna, Paola Càssola Guida, and Susi Corazza, pp. 265-278. Studi di Preistoria e Protostoria 5.https://www.academia.edu/38458437/.

The processes for producing beads and pendants from *Spondylus* shell eliminate the natural characteristics of the shells that allow taxa identification. This article investigates a technique that may permit such identification.

Middleton, Andrew, Susan La Niece, Janet Ambers, Duncan Hook, Richard Hobbs, and Guy Seddon

2007 An Elusive Stone: The Use of Variscite as a Semi-Precious Stone. *The British Museum Technical Research Bulletin* 1:29-34. https://www.academia.edu/53324177/

Seven green beads on a gold necklace found in a Romano-British grave near Gillingham, Kent, have the appearance of weathered green glass but X-ray fluorescence analysis indicates they may be variscite. This study emphasizes the need for analytical investigation of finds of "weathered green glass" from Roman contexts, beyond visual examination.

Middleton, Sinéad

2015 The Classification and Characterisation of Archaeological Glass Using Multi-Elemental Analysis. M.S. thesis. Institute of Technology, Sligo, Ireland.

XRF analysis is used to determine the composition of glass beads and other artifacts recovered from various sites across Ireland that date from the Iron Age through to modern times.

Mihaylov, Philip and Nikoleta Tzankova

2022 Glass Beads from Dren-Delyan Necropolis (Archaeological and Archaeometric Study). In *Ancient Thrace: Myth and Reality. The Proceedings of the Thirteenth International Congress of Thracology, Volume One*, edited by Peter Delev, Totko Stoyanov, Svetlana Yanakieva et al., pp. 271-278. St. Kliment Ohridski University Press, Sofia. https://www.academia.edu/97666606/.

Investigates the beads (including eye beads) recovered from a necropolis in Bulgaria, including their chemical composition. They are attributed to the 6th-4th centuries BC.

Miksic, John

1996 X-Ray Analysis of Glass from Fort Canning, Singapore. *Bulletin de l'École française d'Extrème Orient* 83:187-202.

Reports on the compositional analyses of 14th-century beads, bangles, and vessel fragments. Three glass groups were identified.

2013 *Singapore and the Silk Road of the Sea, 1300-1800.* NUS Press, Singapore.

Chapter 8 concentrates on glass beads recovered from sites in Singapore and Indonesia including their chemical composition.

Miksic, John N., F.D. Bulbeck, K. Karklins, J.-F. Moreau, and R.G.V. Hancock

2007 A Tentative Comparison of Asian and European Glass Trade Beads. In *La mesure du passé: contributions à la recherche en archéométrie (2000-2006),* edited by Allison Bain, Jacques Chabot, and Marcel Moussette, pp. 187-192. BAR International Series 1700. https://www.researchgate.net/publication/255720997.

A small sampling of 12th-14th-centuries red glass beads from Riau, Indonesia, and blue glass beads from Singapore were analyzed using instrumental neutron activation analysis and the results compared to European beads of the 17th-18th centuries.

Miksic, J., C.T. Yap, and Hua Younan

1994 Archaeology and Early Chinese Glass Trade in Southeast Asia. *Journal of Southeast Asian Studies* 25(1):31-46.

Glass beads from Singapore, the nearby Riau Archipelago, and Palembang (South Sumatra, Indonesia) were analyzed by XRFD and the results, combined with historic data, indicate that Riau obtained beads from India, perhaps via Palembang before AD 1200, and later Chinese beads, perhaps from Singapore.

Mildner, Stephanie

2019 Das älteste echte Glas in Mitteleuropa. *Bayerische Archäologie* 4:17-19.

Presents initial results of an archaeometric investigation of glass beads from the Tumulus and Urnfield cultures of Middle Europe.

Mildner, Stephanie, Frank Falkenstein, Jens-Peter Schmidt, and Ulrich Schüssler

2009 Materialanalytische Untersuchungen an ausgewählten Glasperlen des bronzezeitlichen Hortfundes von Neustrelitz, Lkr. Mecklenburg-Strelitz. *Bodendenkmalpflege in Mecklenburg-Vorpommern, Jahrbuch* 57:43-63; https://www.academia.edu/31256163/.

Presents the results of the analysis of Bronze-Age glass beads from a hoard in northeastern Germany.

Mildner, Stephanie, Ulrich Schüssler, Frank Falkenstein, and Helene Brätz

2014 Bronzezeitliches Glas im westlichen Mitteleuropa – Funde, Zusammensetzung und die Frage nach seiner Herkunft. In *Ressourcen und Rohstoffe in der Bronzezeit: Nutzung – Distribution – Kontrolle*, edited by Bianka Nessel, Immo Heskeund, and Dirk Brandherm, pp. 100-108. Arbeitsberichte zur Bodendenkmalpflege in Brandenburg 26. https://www.academia.edu/11998543/.

Chemical analysis of blue glass beads of the Middle and Late Bronze Ages (14th-9th centuries BC) recovered from graves, hoards, and settlements in western Central Europe has identified a new glass group. Its composition is based on a different alkali source with significantly higher potassium content.

2015 Mitteleuropäisches “High-Magnesium-Glass” – Erste Ergebnisse einer archäometrischen Untersuchung zu bronzezeitlichen Glasperlen. *Archäometrie und Denkmalpflege 2015 – METALLA Sonderheft* 7:81-83; https://www.academia.edu/27333262/.

Reports on the archaeometric investigation of Bronze Age glass beads from sites in Central Europe.

Miller, D.E. and J. Kinahan

1992-1993 The Metallurgical Analysis of Copper Beads and Ore from Archaeological Sites in Central Namibia. *Communications of the Geological Survey of Namibia* 8:73-86.

Several beads from three site areas in Namibia were subjected to metallographic and chemical analysis. All appear to date to the 18th century.

Miller, Jennifer M. and Pamela Rae Willoughby

2014 Radiometrically Dated Ostrich Eggshell Beads from the Middle and Later Stone Age of Magubike Rockshelter, Southern Tanzania. *Journal of Human Evolution* 74:118-122.

Three of the samples date to the MSA, and represent the earliest directly radiocarbon dated OES beads currently known. This new data demonstrates that the tradition of OES beadmaking is not unique to the LSA, but began sometime during the terminal stages of the MSA.

Mirtsou, E.M., Vavelidis, D. Ignatiadou, and M. Pappa

2001 Early Bronze Age Faience Beads from Agios Mamas, Chalkidiki: A Short Note. In *Archaeometry Issues in Greek Prehistory and Antiquity, 3rd Symposium on Archaeometry, Athens 1996*, edited by Yannis Bassiakos, Eleni Aloupi, and Yorgos Facorellis, pp. 309-316. Hellenic Society for Archaeometry and Society of Society of Messenian Archaeological Studies, Athens.

Seeks to determine the chemical composition of the beads and the method of their manufacture. In Greek with an English abstract.

Miśta-Jakubowska, Ewelina, Renata Czech Błońska, Władysław Duczko, Aneta M. Gójska, Paweł Kalbarczyk, Grzegorz Żabiński, and Krystian Trela

2019 Archaeometric Studies on Early Medieval Silver Jewellery from Central and Eastern Europe. *Archaeological and Anthropological Sciences* 11:6705-6723; https://www.academia.edu/47201535/.

SEM-EDX analysis of silver beads and pendants from three hoards found in Poland that date to AD 900-1039 provides information concerning granulation techniques used for ornaments and the source of the raw silver. *See* Pernicka (2020) for a critique and Miśta-Jakubowska et al. (2020) for a response.

2020 Correction to: Archaeometric Studies on Early Medieval Jewellery from Central and Eastern Europe. *Archaeological and Anthropological Sciences* 12(6), Article 108; https://www.academia.edu/47666152/.

Referring to Professor Pernicka's remarks, the authors clarify doubts concerning the appropriateness of the use of laser ablation coupled with a quadrupole mass spectrometer in archaeometry.

Molist, M., I. Montero-Ruiz, X. Clop, S. Rovira, E. Guerrero, and J. Anfruns

2009 New Metallurgic Findings from the Pre-Pottery Neolithic: Tell Halula (Euphrates Valley, Syria). *Paléorient* 35(2):33-48.

Numerous burials were accompanied by beads and pendants of shell, stone, bone, and copper. A detailed compositional analysis is presented of the copper specimens.

Monterrosa Desruelles, Hervé Victor

2018 La presencia maya en el Templo Mayor de Tenochtitlan. El análisis tecnológico de los objetos de jadeíta verde imperial. Ph.D. dissertation. Escuela Nacional de Antropología e Historia, Mexico DF. https://www.academia.edu/81066342/.

Provides a technological analysis of Mayan imperial-green jadeite objects (including beads and pendants) recovered from the Great Temple of Tenochtitlan in central Mexico.

Moreau, Jean-François

2014 Au temps de la traite des fourrures : les perles du « contact ». In *Enjeux théoriques et pratiques du développement régional : 30 Ans de recherche au GRIR*, edited by Danielle Maltais and Suzanne Tremblay, pp. 51-70. Université du Québec à Chicoutimi, Chicoutimi; https://www.academia.edu/66580014/.

On beads of the early fur trade in Quebec, including their chemical composition.

Moreau, Jean-François, B. Gratuze, R.G.V. Hancock, and M. Blet Lemarquand

2011 The Dating of a Sixteenth Century Settlement in the Vicinity of Quebec City (Canada) by Means of Elemental Analysis of Glass Beads Through Thermal and Fast Neutron Activation Analyses. In *Proceedings of the 37th International Symposium on Archaeometry, 13th-16th May 2008, Siena, Italy,* edited by Isabella Turbanti-Memmi, pp. 501-508. Springer.

Moreau, Jean-François and R.G.V. Hancock

2010 "Un siècle d'approvisionnement: 1550-1650:" de la préhistoire à l'histoire au site du poste de traite de Chicoutimi. *Archéologiques* 23:84-98.

Using neutron activation analysis to compare several series of white glass beads uncovered at the Chicoutimi trading post site in Quebec, Canada, with a series of other collections whose dates are well established has lent support to the hypothesis, based on bead typology, that the site contains an Amerindian layer dating from the contact period (1600-1650).

Moreau, Jean-François, R.G.V. Hancock, Susanne Aufreiter, and Ian Kenyon

2002 Late French (1700-1750) to Early English (1750-1800) Regime White Glass Trade Beads from a Presumed Decorated Bag Found at the Ashuapmushuan Site (Eastern Central

Québec), Canada. In *Archaeometry 98, Proceedings of the 31st Symposium*, edited by E. Jerem and K.T. Biro, pp. 613-619. BAR International Series 1043.

Moreau,Jean-François, R.G.V. Hancock, Susanne Aufreiter, and Ian Kenyon

1997 Taphonomical and Chronological Studies of a Concentration of European Glass Trade Beads from Ashuapmushuan, Central Quebec (Canada). In *Proceedings of the Seventh Nordic Conference on the Applications of Science in Archaeology,* edited by H. Junger and M. Lavento, pp. 173-181. Esbjerg Museum, Esbjerg, Denmark.

2002 Analysis of White Beads of a Late 17th Century Decorated Bag from the Ashuapmuchuan Site (Eastern Central Quebec), Canada. In *Archaeometry 98: Proceedings of the 31st Symposium, Budapest, April 26-May 3 1998*, pp. 613-620. British Archaeological Reports, International Series 1043(II).

Neutron activation analysis of the beads was used to test the temporal assignment of the bag as well as the anthropological interpretation of the beads as pertaining to a decorative pattern on the bag.

Moreau, Jean-François, R.G.V. Hancock, and M. Moussette

2006 Toward a Chrono-Seriation Method Based on European Trade White Beads in Northeastern North America. In *34th International Symposium on Archaeometry, 3-7 May 2004, Zaragoza, Spain*, edited by J. Pérez-Arantegui, pp. 85-90. Institución Fernando el Católico, Zaragoza.

The INAA analysis of glass beads recovered from two sites in Quebec City, Canada, has helped to determine the chronometric trend for specific elements in beads of the third quarter of the 18th century.

Moretti, C. and B. Gratuze

1999 Vetri rossi al rame e aventurina. Confronto di analisi e ricette. *Rivista della Stazione Sperimentale del Vetro* 29(3):147-160.

Samples of copper-red glasses from the Roman period to the 19th century were analyzed using modern techniques, also a sample of aventurine glass. These results were compared, when possible, with formulae found in Venetian recipe manuscripts dating from the 14th-19th centuries.

Morozova, E.A., I.F. Kadikova, T.V. Yuryeva, and V.A. Yuryev

2017 Crystallites in Color Glass Beads of the 19th Century and their Influence on Fatal Deterioration of Glass. https://arxiv.org/pdf/1705.08330, accessed 5 June 2017.

The colonies of micro and nanocrystallites of orthorhombic $KSbOSiO_4$ (KSS) detected in blue-green glass beads play a key role in the corrosion process that starts internally rather than from the surface as is common for glass objects.

Morris, Don P. and Jon M. Erlandson

1993 A 9,500 Year-Old Human Burial from CA-SRI-116, Santa Rosa Island. *Journal of California and Great Basin Anthropology* 15:129-134.

Reports a suite of radiocarbon dates for the burial which had five small *Olivella biplicata* beads in the thorax region. California.

Moutsiou, Theodora, **Demetrios Ioannides, Andreas Charalambous, Sebastian Schöder, Sam M. Webb, Mathieu Thoury, Vasiliki Kassianidou, Zomenia Zomeni, and Christian Reepmeyer**

2022 X-ray Fluorescence Spectroscopy of Picrolite Raw Material on Cyprus. *Heritage* 5(2):664-676; https://doi.org/10.3390/heritage5020037.

The artifacts studied include one bead, three pendants, and two small pebbles that are probably pendant preforms.

Moutsiou, Theodora and Vasiliki Kassianidou

2019 Geochemical Characterisation of Carnelian Beads from Aceramic Neolithic Cyprus Using Portable X-Ray Fluorescence Spectrometry (pXRF). *Journal of Archaeological Science: Reports* 25:257-265.

Analysis suggests multiple origins for the carnelian raw material and, more significantly, demonstrates that occasionally other materials, visually indistinguishable from carnelian, were used in bead manufacture. The authors consider the symbolic role of these raw material choices and propose that these early island communities engaged in a system of linked values with their mainland counterparts dependent on the materials exchanged objects were made of.

Mukherjee, Anna J., E. Roßberger, M.A. James, P. Pfälzner, C.L. Higgitt, R. White, D.A. Peggie, D. Azar, and R.P. Evershed

2008 The Qatna Lion: Scientific Confirmation of Baltic Amber in Late Bronze Age Syria. *Antiquity* 82: 49-59.

Analysis of amber beads and a unique vessel in the form of a lion found in a royal tomb revealed that they were likely fashioned in Syria from raw amber imported from the Baltic via the Aegean.

Murillo-Barroso, Mercedes

2016 Capítulo 13. El ámbar del *Tholos* de Montelirio. In *Montelirio. Un gran monumento megalítico de la Edad del Cobre*, edited by Á. Fernández Flores, L. García Sanjuán, and M. Díaz-Zorita, pp. 311-344. Conserjería de Cultura, Sevilla.

The tholos yielded the largest collection of amber objects of Iberian Late Prehistory found so far with over 250 beads and pendants. Fourier transform infra-red spectroscopy (FTIR) analysis shows that the samples resemble Sicilian simetita. Spain.

Murillo-Barroso, Mercedes, Rafael M. Martínez-Sánchez, and Juan Carlos Vera-Rodríguez

2018 El ámbar de la Cueva de los Cuarenta (Priego de Córdoba,Córdoba) / Amber from Cueva de los Cuarenta (Priego de Córdoba, Southern Iberia). *Trabajos de Prehistoria* 75(2):333-343.

Provides archaeometric data on an amber bead or pendant found in Neolithic contexts in a cave in southern Spain. It was the only ornament found among a minimum number of 41 inhumations.

Murillo-Barroso, Mercedes and Marcos Martinón-Torrés

2012 Amber Sources and Trade in the Prehistory of the Iberian Peninsula. *European Journal of Archaeology* 15(2):187-216; https://www.academia.edu/1877438/.

Presents Fourier-transform infrared spectroscopy (FTIR) characterization of archaeological amber from three Iberian prehistoric sites, including a necklace recovered from the megalithic site of Palacio III (Almadén de la Plata, Sevilla) and a necklace from the Muricecs de Cellers cave (Llimiana, Pallars Jussà, Lleida).

Murillo-Barroso, Mercedes, Marcos Martinón-Torrés, Leonardo García Sanjuán, David Wheatley, Mark A. Hunt Ortiz, Matilde Forteza González, and María Jesús Hernández Arnedo

2015 New Objects in Old Structures. The Iron Age Hoard of the Palacio III Megalithic Funerary Complex (Almadén de la Plata, Seville, Spain). *Journal of Archaeological Science* 57:322-334.

Presents the contextual, morphological, and analytical study of an exceptional hoard that includes a necklace of dark red amber beads, a circular carnelian bead, and a tongue-shaped silver pendant. Compositional analysis reveals the sources of the materials.

Murillo-Barroso, Mercedes, Enrique Peñalver, Primitiva Bueno, Rosa Barroso, Rodrigo de Balbín, and Marcos Martinón-Torres

2018 Amber in Prehistoric Iberia: New Data and a Review. *PloS ONE* 13(8):e0202235; https://www.academia.edu/37330351/.

Presents new standardized FTIR analyses of 22 archaeological (beads included) and geological samples from a large number of contexts across Iberia, as well as a wide scale review of all the legacy data available.

Muros, Vanessa and Nikolaos Zacharias

2019 Lines, Spots and Trails: A Microscopic and Mineralogical Study of Antimonate-Opacified Glass Beads from Lofkënd, Albania. *Archaeological and Anthropological Sciences* 11:1769-1782; https://www.academia.edu/41629082/.

Analysis of four glass beads dated to the 12th-10th centuries BC revealed they were made using a plant-ash-based alkali and colored with an iron containing chromophore which gave the glass its dark green color. Calcium antimonate was the predominant white opacifier used though sodium antimonate was found as the opacifier in one sample.

Nagy, Géza

1996 *Jelentés avarkori üveggyöngyök elektron-mikroszondás vizsgálatáról.* Kutatási Jelentés. MTA Geokémiai Kutatólaboratórium, Budapest, G. 331.

Reports on the electron microprobe examination of Avar glass beads, Hungary.

Nagy, Géza, Adrien Pásztor, István Fórizs, and Mária Tóth

2010 Szarmata és avar kori üveggyöngyök elektronmikroszondás Vizsgálata [Investigation of Sarmatian and Avar Glass Beads by Electron Microprobe]. *Archeometriai Műhely* 1:27-50.

Nearly 200 glass beads found in Sarmatian (2nd-4th centuries) and Avar (6th-8th centuries) graves in Hungary were subjected to instrumental analysis. English abstract.

Nakai, Izumi, Yanase Kazuya, Matsuzaki Mayumi, Sawamura Daichi, and Nagahama Koji

2014 Chemical Analysis of Glass Beads Excavated from Kagoshima Prefecture. *From Jomon no Mori: Bulletin of Kagoshima Prefectural Archaeological Center* 6:45-50. http://www.jomon-no-mori.jp/jimages/mbn_kiyo/kiyo7/kiyo7_45-50.pdf, accessed 27 Dec. 2014.

Japan; in Japanese but images of the beads are provided and the analytical tables are partially in English.

Nakai, Izumi and Yoko Shindo

2013 Glass Trade between the Middle East and Asia. In *Modern Methods for Analysing Archaeological and Historical Glass, Vol. I.*, edited by Koen Janssens, pp. 445-457. Wiley Online Library.

Discusses glass beads from ancient tombs in Japan.

Nakai, Izumi and Junko Shirataki

2016 Chemical Composition of Glass Beads Excavated from Kofun (ca. AD 2nd to 7th c.) in Western Japan by Portable XRF Showing Glass Trade among Asian Countries. In *Recent Advances in the Scientific Research on Ancient Glass and Glaze,* edited by Fuxi Gan, Qinghui Li, and Julian Henderson, pp. 73-94. World Century Publishing, Hackensack, NJ, and World Scientific Publishing, Singapore.

Reports on the chemical analysis of glass beads excavated from 10 different *Kofun* (megalithic tombs or tumuli) in Kumamoto and Okayama prefectures in Japan to determine origins and the colorants used.

Nakai, Izumi, K. Tantrakarn, Y. Abe, and S. Omura

2013 Study on Western Asiatic Cast Ribbed Rectangular Beads from Kaman-Kalehöyük, Turkey, by Using Portable XRF. *Open Journal of Archaeometry* 1(1):109-114.

This study provides the first scientific material evidence that shows the possibility of culture flow from the Mesopotamia region to Kaman-Kalehöyük during Middle-Late Bronze Age (16th-15th centuries BC).

Nakai, Izumi, Kriengkamol Tantrakarn, Norihiro Kato, N. Kawai, A. Nishisaka, and S. Yoshimura

2009 XRF Analysis of 16th Century BC Transparent Glass Beads Excavated from a Hillside in Northwest Saqqara, Egypt. *Annales du 17^{e} Congrès d'Associationi Internationale Pour l'histoire du Verre, Anvers 2006*, pp. 27-31.

Nakamura, Daisuke, Tomomi Tamura, Tetsuo Warashina, and Diimaajav Erdenebaatar

2021 Scientific Analysis on the Glass and Stone Artifacts in Ulaanbaatar State University. *Saitama University Minutes (Faculty of Liberal Arts)* 56(2):105-116; https://www.researchgate.net/publication/359055723.

Reports on the X-ray fluorescence analysis of glass and stone artifacts (including beads) from several sites of the Bronze Age and Xiongnu period in Mongolia.

Nakamura, D. and T. Warashina

2009 Physicochemical Analysis of Beads and its Distribution on the Korean Peninsula. In *Graphical Abstracts of the Japanese Archaeological Association 75th Annual Meeting,* pp. 26-27. Japanese Archaeological Association, Tokyo.

In Japanese.

Nándor, Kalicz, Zsuzsanna Siklósi, Gabriella Schöll-Barna, Bernadett Bajnóczi, George H. Hourmouziadis, Fotis Ifantidis, Aikaterini Kyparissi-Apostolika, Maria Pappa, Rena Veropoulidou, and Christina Ziota

2012 Aszód – Papi-földek késő neolitikus lelőhelyen feltárt kagylóékszerek származási helyének meghatározása stabilizotóp-geokémiai módszerrel [Stable Isotope Geochemical Provenance Study of Shell Ornaments from Aszód – Papi-földek]. In *Környezet – Ember – Kultúra: Az alkalmazott természettudományok és a régészet párbeszéde*, edited by A. Kreiter, A. Pető, and B. Tugya, pp. 317-326. Magyar Nemzeti Múzeum Nemzeti Örökségvédelmi Központ, Budapest. https://www.academia.edu/1525974/.

Reports on the composition of shell beads and bracelets from a Late Neolithic site in Hungary and compares the findings to *Spondylus* artifacts from Neolithic sites of Greece, modern shells from the Aegean and Adriatic seas, as well as fossil *Spondylus* and *Ostrea* shells from the Carpathian Basin. In Hungarian with English abstract.

Napolitano, Matthew F., Elliot H. Blair, Laure Dussubieux, and Scott M. Fitzpatrick

2022 Chemical Analysis of Glass Beads in Palau, Western Micronesia Reveals 19th Century Inter-Island Exchange Systems in Transition. *Journal of Archaeological Science: Reports* 45(2), 103542; https://www.researchgate.net/publication/362108263.

Analysis of 38 glass beads recovered from Chelechol ra Orrak revealed that most of them were manufactured in Europe, with many originating in Bohemia ca. AD 1830-1850.

Natuniewicz-Sekuła, Magdalena

2017 The Craft of the Goldsmith in Wielbark Culture in the Light of the Finds from the Cemetery at Weklice, Elbląg Commune and Other Necropolis of Roman Period from Elbląg Heights. Technological Studies of Selected Aspects. *Sprawozdania Archeologiczne* 69:185-233; https://www.academia.edu/34825917/.

Discusses the chemical composition and production techniques of gold, silver, and copper-alloy beads and pendants from sites in northern Poland.

Neri, Elisabetta, Bernard Gratuze, and Nadine Schibille

2018 Correction to: The Trade of Glass Beads in Early Medieval Illyricum: Towards an Islamic Monopoly. *Archaeological and Anthropological Sciences*; https://doi.org/10.1007/s12520-018-0635-5

Corrects minor errors in Table 2 (samples K_013, K_018, K_019, and Lz_012).

2018 The Trade of Glass Beads in Early Medieval Illyricum: Towards an Islamic Monopoly. *Archaeological and Anthropological Sciences*; https://www.academia.edu/58692591/.

Explores the impact of the Byzantine-Slavic transition on the use and, by extension, trade of glass beads in the Balkans from the 7th to the 9th century C.E. A series of 48 glass beads from two sites in Albania analyzed morphologically, technologically, and chemically by LA-ICP-MS provide the evidence.

Newman, Richard, Emily Kaplan, and Maria Cecilia Álvarez-White

2023 The Story of *Elaeagia* Resin (Mopa-Mopa), So Far. *Heritage* 6, 4320-4344; https://www.academia.edu/102194566/.

The resin was used to create beads, mostly tubular, during the pre-Hispanic period in the southwestern part of present-day Colombia. Includes a section on the analytical identification of *Elaeagia* resins.

Ngan-Tillard, D., H. Huisman, F. Corbella, and A. van Nass

2018 Over the Rainbow? Micro-CT Scanning to Non-Destructively Study Roman and Early Medieval Glass Bead Manufacture. *Journal of Archaeological Science* 98:7-21; https://www.academia.edu/85699043/.

Explores the potential of desktop micro-CT scanners for inspecting and quantifying the microstructure of glass beads from two sites in the Netherlands to determine manufacturing techniques.

Nikita, Kalliopi

2003 A Review of the Chemical Analyses of Glass and Faience Beads in the Bronze Age Aegean. *Bead Study Trust Newsletter* 42:4-9; https://www.societyofjewelleryhistorians.ac.uk/bead_study_trust.

Nikita, Kalliopi and Julian Henderson

2006 Glass Analyses from Mycenaean Thebes and Elateia: Compositional Evidence for a Mycenaean Glass Industry. *Journal of Glass Studies* 48:71-120; https://www.academia.edu/37610271/.

Chemical analyses of glasses (including beads) from Thebes and Elateia have radically changed earlier views about a Mycenaean glass industry dependent on Eastern glass-producing centers for the procurement of raw glass and operating solely as a secondary glass production zone for the manufacture of jewelry.

Nikita, Kalliopi, Julian Henderson, and Georg Nightingale

2009 An Archaeological and Scientific Study of Mycenaean Glass from Elateia-Alonaki, Greece. *Annales of the 17th Congress of the International Association for the History of Glass, 2006, Antwerp,* pp. 39-46.

Presents and discusses the results of the archaeological and scientific study of 81 simple and relief glass beads from the Mycenaean chamber-tomb cemetery at Elateia-Alonaki, Greece. The beads date from the beginning of the Late Helladic IIIA period (about 1425/1390 BC) to the Early Protogeometric period (about 1000/950 BC), and their chemical composition was determined using electron probe microanalysis.

Nikita, Kalliopi, Georg Nightingale, and Simon Chenery

2017 Mixed-Alkali Glass Beads from Elateia-Alonaki: Tracing the Routes of an Alien Glass Technology in the Periphery of Post-Palatial Mycenaean Greece. In *Hesperos. The Aegean Seen from the West, Proceedings of the 16th International Aegean Conference, University of Ioannina, Department of History and Archaeology, Unit of Archaeology and Art History, 18-21 May 2016,* edited by Michael Fotiadis, Robert Laffineur, Yannos Lolos, and Andreas Vlachopoulos, pp. 515-524. Aegaeum 41. https://www.academia.edu/17037973/.

The glass presents a composition that is alien to the well-established technological tradition of the plant-ash glass production in the Eastern Mediterranean and the Near East during the Late Bronze Age. The appearance of glass beads that belong to a technology typical of glass production in Northern Italy and Central Europe is a unique phenomenon in the post-palatial Mycenaean periphery.

Novotná, Miroslava

2012 Analýza vzorků jantarových artefaktů z období KZP na Moravě [Analysis of Samples of Amber Artefacts of the BB Period in Moravia]. In *Pohřebiště z období zvoncovitých pohárů na trase dálnice D1 Vyškov - Mořice* [Funerary Areas of the Bell Beaker Period on the D1 Vyškov-Mořice Motorway], edited by A. Matějíčková and P. Dvořák, pp. 347-352. Pravěk, Supplementum 24. https://www.academia.edu/44658822/.

Four of five amber bead and V-perforated button samples from Bell Beaker Culture sites in Moravia, Czechia, are identified as Baltic amber; the exception is identified as simetite, a form of amber originating in Italy. English summary.

Odriozola, Carlos P.

2015 A New Approach to Determine the Geological Provenance of Variscite Artifacts Using the P/Al Atomic Ratios. *Archaeological and Anthropological Sciences* 7(3):329-350.

Reports on a technique which helps link variscite artifacts (including beads) recovered from Iberian sites of the 4th-2nd millennia to source mines. Spain.

Odriozola, Carlos P., Luis Benítez de Lugo Enrich, Rodrigo Villalobos García, José M. Martínez-Blanes, Miguel A. Avilés, Norberto Palomares Zumajo, and María Benito Sánchez

2016 Personal Body Ornamentation on the Southern Iberian Meseta: An Archaeomineralogical Study. *Journal of Archaeological Science: Reports* 5:156-167.

A sample of stone beads and pendants were analyzed using XRD, micro-Raman, and XRF in order to contribute to the current distribution map of green-bead body ornaments on the Iberian Peninsula. Most of the beads from Castillejo del Bonete (late 3rd millennium cal. BC) were made from variscite or green phyllosilicates, while those from Cerro Ortega (late 4th millennium cal. BC) were made of fossil wood or clinochlore.

Odriozola Lloret, Carlos P. and Leonardo García Sanjuán

2013 Las cuentas de collar de piedra verde de Matarrubilla (Valencina de la Concepción (Sevilla). In *El Asentamiento Prehistórico de Valencina de la Concepción (Sevilla),* edited by L. García Sanjuán et al., pp. 485-493. Universidad de Sevilla, Historia y Geografía 243. https://www.academia.edu/3406513/.

The analysis of a group of green-stone necklace beads excavated at Matarrubilla (part of the Copper Age site of Valencina de la Concepción-Castilleja de Guzmán (Seville, Spain) has revealed the possible origin of the stone.

Odriozola, Carlos P., José Ángel Garrido Cordero, Joan Daura Luján, and Montserrat Sanz

2020 Resin-Coated Beads in Iberian Late Prehistory (3rd-2nd millennia BCE). *Materials and Manufacturing Processes* 35(13): 420-1423; https://doi.org/10.1080/10426914.2020.1750634.

A group of beads from the artificial cave of La Molina (Lora de Estepa, Sevilla) and Cova del Gegant (Sitges, Barcelona) were made from biogenic raw material and intentionally covered by a layer of resin. This is the first time this type of treatment has been documented on elements of adornment in the Late Prehistory of the Iberian Peninsula. The composition and nature of the coatings are analyzed and the symbolic role of such alterations and imitations of prehistoric adornments is discussed.

Odriozola, Carlos P., José Ángel Garrido-Cordero, Cláudia Santos, Elisabete Barradas, and Ana Catarina Sousa

2020 The Stone Beads from Barrada's Hypogeum 1 (Aljezur, Algarve, Portugal). Greenstone Distribution Patterns in the Iberian Southwest Late Neolithic. *Journal of Archaeological Science: Reports* 34, Part B, 102667; https://doi.org/10.1016/j.jasrep.2020.102667.

Offers a characterization of the raw materials and the chronology of a bead assemblage found with a burial in Portugal by means of X-Ray Fluorescence (p-XRF) and the radiocarbon dating of a tibia directly associated with the beads under study.

Odriozola, Carlos P. and J.A. Linares-Catela

2012 Cuentas de variscita: Producción, circulación y presencia en contextos funerarios del suroeste peninsular. *Rubricatum: Revista del Museu de Gavà* 5:323-332.

Uses XRD and XRF analysis of variscite beads coming from different megalithic contexts in southwestern Spain to determine the source of the material.

Odriozola, Carlos P., J.A. Linares-Catela, and V. Hurtado-Pérez

2010 Caracterización de la fuente de variscita de Pico Centeno (Encinasola, Huelva) y estudio de procedencia de cuentas del Suroeste peninsular. In *Actas VIII Congreso Ibérico de Arqueometría, Teruel, 19 - 21 de octubre de 2009,* edited by Esperanza Saiz Carrasco, Raúl López Romero, Ascensión Cano Díaz-Tendero, and Juan Carlos Calvo García, pp. 135-146.

Characterizes the variscite from the Pico Centeno mines in north-central Spain and compares them to specimens from other sources and to 50 green beads from megalithic tombs from two different regions.

2010 Perdigões' Green Beads Provenance Analysis. *Apontamentos de Arqueología e Patrimonio* 6:47-51.

Discusses the provenance of green beads from Perdigões in southwestern Spain by means of XRF and XRD analyses.

2010 Variscite Source and Source Analysis: Testing Assumptions at Pico Centeno (Encinasola, Spain). *Journal of Archaeological Science* 37(2):3146-3157.

Discusses the exploitation and exchange of variscite at the Pico Centeno mining district during the Copper Age. XRF, XRD, and FTIR analyses of the minerals recovered there during archaeological survey provide a baseline mineral signature for the source and sub-sources, which were then compared to other Iberian sources and to 44 green beads from 8 megalithic tombs from two different regions, in order to test "provenance postulate" and distribution models.

2013 Provenancing Variscite Beads: Pico Centeno (Encinasola, Spain) Outcrop Case Study. *Open Journal of Archaeometry* 1(e17):80-84.

Comparing the composition of variscite samples from the Pico Centeno mining district utilized during the Copper Age to variscite samples and beads from other Iberian sources revealed that

the concentrations of trace elements do not allow establishing a provenance for the beads, as traditionally claimed.

Odriozola, Carlos P., Rui Mataloto, Jesús Moreno-García, Rodrigo Villalobos-García, and José María Martínez-Blanes

2012 Producción y circulación de rocas verdes y sus productos en el sw peninsular: el caso de Anta Grande do Zambujeiro. *Estudos Arqueológicos de Oeiras* 19:125-142; https://www.academia.edu/49481557/.

XRF and XRD analysis of green beads from megalithic structures and settlements of the 3rd millennium BCE in southwestern Iberia identified several minerals (variscite, muscovite, talc, chlorite). Comparisons with mineral data from mining complexes in the region shows that the raw materials for beadmaking were exchanged as exotics on a regional and supra-regional scale.

Odriozola, Carlos P., Joaquina Soares, Carlos Tavares da Silva, and Paulo E. Fonseca

2016 Iberian Southwest Middle Bronze Age. Reading Social Complexity in Greenstone Beads from the Cist Necropolis of Sines. In *Social Complexity in a Long Term Perspective*, edited by Joaquina Soares, pp. 131-152. Setúbal Arqueológica 16.

Chemical and mineralogical analysis of a group of greenstone beads from the cemeteries of Provença and Pessegueiro in southwestern Portugal showed that they were not made out of variscite, but of raw material available in the geological structure of Serra do Cercal.

Odriozola, Carlos P., Ana C. Sousa, Rui Mataloto, Rui Boaventura, Marco Andrade, Rodrigo Villalobos García, José Ángel Garrido-Cordero, Eugenio Rodríguez, José María Martínez-Blanes, Miguel Ángel Avilés, Joan Daura, Montserrat Sanz, and José Antonio Riquelme

2017 Amber, Beads and Social Interaction in the Late Prehistory of the Iberian Peninsula: An Update. *Archaeological and Anthropological Sciences*; https://doi.org/10.1007/s12520-017-0549-7.

Approaches the analysis of Iberian Peninsula amber artifacts from the 6th to 2nd millennia BCE by considering their provenance (based on FTIR characterization), chronology, and spatial relationship with other exotica.

Odriozola, Carlos P., Rodrigo Villalobos Garcia, Rui Boaventura, Ana Catarina Sousa, J.M. Martinez-Blanes, and Joao Luis Cardoso

2013 Las producciones de adorno personal en rocas verdes del SW peninsular: los casos de Leceia, Moita da Ladra y Penha Verde. *Estudos Arqueológicos de Oeiras* 20:605-622; https://www.academia.edu/7464235/.

On the production of personal adornments (beads included) of green stone at three Chalcolithic villages in Portugal. Compositional analysis is provided.

Odriozola, Carlos P., Rodrigo Villalobos García, Primitiva Bueno Ramírez, Rosa Barroso Bermejo, Raúl Flores Fernández, and Pedro Díaz-del-Río

2017 Late Prehistory Body Ornaments. Exchange and Social Dynamics in the Middle Tagus Basin. In *Key Resources and Socio-Cultural Developments in the Iberian Chalcolithic*, edited by Martin Bartelheim, Primitiva Bueno Ramírez, and Michael Kunst, pp. 55-88. RessourcenKulturen 6.

Stone body ornamentation in the middle Tagus Basin, Spain, is approached through the study of variscite bead production variability at 4th-2nd millennium BC sites with particular focus on the spatial variability of raw materials and their chronological and contextual patterning. Includes archaeometric analysis.

Ōga, Katsuhiko

2011 An Archaeological Consideration of the Beads Excavated from the Kondō at Tōdai-ji Temple. *Bulletin of the Nara National Museum "Rokuon Zasshu"* 13:92-79 (43-56).

Reports on the chemical composition of the beads from the temple in Japan. Text is in Japanese. *See also* Tomomi (2011).

Oga, Katsuhiko and Tomomi Tamura

2013 Ancient Japan and the Indian Ocean Interaction Sphere: Chemical Compositions, Chronologies and Trade Routes of Imported Glass Beads in the Yayoi-Kofun Periods (3rd century BCE - 7th century CE. *Journal of Indian Ocean Archaeology* 9:35-65.

Most ancient glass beads in Japan were brought there by long-distance ocean trade in the BCE-CE transition. This study categorizes the beads on the basis of chemical composition.

Oga, Katsuhiko, Tomomi Tamura, Shinta Inagaki, and Kazuyuki Nakamura

2017 Archaeometrical Investigation of Glass Beads from Aonae Site in Okushiri Island, Hokkaido. *Research Reports of National Institute of Technology, Hakodate College* 51:38-47.

Examines the beadmaking technique and chemical composition of wound glass beads. They are made of plant-ash soda glass colored by cobalt, and they can be classed into two groups. In Japanese with English abstract. Japan.

Ogundiran, Akinwumi and O. Akinlolu Ige

2015 "Our Ancestors Were Material Scientists": Archaeological and Geochemical Evidence for Indigenous Yoruba Glass Technology. *Journal of Black Studies* 46(8):751-772.

Compositional analysis of crucibles, glass cullet, and glass beads excavated at Osun Grove (Osogbo, Nigeria) reveals that the Yoruba of West Africa developed a unique glassmaking technology that lasted till the 17th century.

Oikonomoua, Artemios, Konstantinos Beltsios, and Nikolaos Zacharias

2012 Analytical and Technological Study of Blue Glass from Thebes, Greece: An Overall Assessment. *Annales du 18^{e} Congrès de l'Association Internationale pour l'Histoire du Verre, Thessaloniki 2009*, pp.81-86; https://www.academia.edu/36066458/.

Thirty-seven samples, mostly beads, ranging from the Archaic to the Hellenistic period, were analyzed to determine their composition and processing temperatures.

Oikonomoua, Artemios, Maria Kaparou, Vid S. Šelih, Johannes T. van Elteren, Nikolaos Zacharias, Simon Chenery, and Julian Henderson

2023 Theban Glass Traditions in the 1st Millennium BCE, Greece: New LA-ICP-MS Data and Their Archaeological Implications. *Heritage* 6(1):705-723; https://doi.org/10.3390/heritage6010038.

The aim is to assess some technological aspects of the assemblage, provide a chemical fingerprint for it, and suggest a likely provenance to facilitate a discussion of the issues of glass consumption and trade at a given era.

Oikonomoua, A. and P. Triantafyllidis

2018 An Archaeometric Study of Archaic Glass from Rhodes, Greece: Technological and Provenance Issues. *Journal of Archaeological Science: Reports* 22:493-505; https://www.academia.edu/37231892/.

Both major/minor and trace-element analysis of 86 beads indicates a Mesopotamian origin.

Oikonomoua, A., P. Triantafyllidis, K. Beltsios,, N. Zacharias, and M. Karakassides

2008 Raman Structural Study of Ancient Glass Artefacts from the Island of Rhodes. *Journal of Non-Crystalline Solids* 354:768-772; https://www.academia.edu/36066336/.

Twenty-five glass artifacts, mostly fragmented beads, recovered from the Kameiros citadel of Rhodes (Greece) and dating to 640-600 BC were analyzed to determine essential compositional trends and glass processing temperatures.

Olmeda, Giulia, Ivana Angelini, Gianmario Molin, Stefano Boaro, and Giovanni Leonardi

2015 Archaeometric Analysis of Vitreous Material Ornaments from the Villa di Villa Site (Treviso, Italy). *Rendiconti Lincei* 26(4):513-527; https://www.academia.edu/31031915/.

Reports on the chemical and mineralogical analyses of eight vitreous material ornaments (four beads included) with a poorly defined chronology, coming from a protohistoric and Roman site in Cordignano-Colle Castelir, northeastern Italy.

Olmeda, Giulia, Benedetta Prosdocim, Ivana Angelini, Michele Cupitò, Gianmario Molin, and Giovanni Leonardi

2015 Archeologia e archeometria delle perle in vetro della necropoli patavina del CUS-Piovego (VI-IV sec. a.C.). Osservazioni sulla tecnologia del vetro in Veneto nella piena Età del ferro. In *Preistoria e Protostoria del Veneto,* edited by Giovanni Leonardi and Vincenzo Tiné, pp. 549-557. Studi di preistoria e protostoria 2.

Discusses the composition of glass beads recovered from a cemetery in northern Italy that is attributed to the Middle Iron Age (6th-4th centuries BC). English abstract.

Ono, Rintaro, Fadilah Aziz, Adhi Agus Oktaviana, Dyah Prastiningtyas, Marlon Ririmasse, Nurachman Iriyanto, Irwansyah Zesse, Yoichiro Hisa, and Minoru Yoneda

2017 Development of Regional Maritime Networks during the Early Metal Age in Northern Maluku Islands: A View from Excavated Glass Ornaments and Pottery Variation. *The Journal of Island and Coastal Archaeology* 13(1); https://doi.org/10.1080/15564894.2017.1395374.

Presents the results of compositional analysis of glass beads and other ornaments from a site in Indonesia dating to ca. 2100-1900 years B.P. These date, combined with variable pottery, indicate the possible development of maritime and cross-regional networks to the Northern Maluku Islands.

Os, B.J.H. van, R.M. Vogelzang, J.W. de Kort, D.J. Huisman, M. Kars, D.J.M. Ngan-Tillard, W. Verwaal, and E. Meijvoge

2014 Kralen van glas en barnsteen. In *Merovingers in een villa 2: Romeinse villa en Merovingisch grafveld Borgharen – Pasestraat Onderzoek 2012*, edited by R.C.G.M. Lauwerier and J.W. de Kort, pp. 134-154. Rapportage Archeologische Monumentenzorg 222.

Presents a study of the glass and amber beads recovered from a Merovingian site in the southern Netherlands. Includes compositional analysis.

Osanai, Yasuhito, Tatsuro Adachi, Kazuhiro Yonemura, and Kazuo Miyamoto

2016 Substance Identification of the Beads at the Stone-Slab Grave from Daram Site, Khentii Province, Mongolia. In *Excavations at Daram and Tevsh Sites: A Report on Joint Mongolian-Japanese Excavations in Outer Mongolia,* edited by Kazuo Miyamoto and Hiroki Obata, pp. 73-75. Kyushu University, Fukuoka.

Based on instrumental analyses, a tubular bead and a round bead found at a stone-slab grave at the Daram Site were identified to be talc and microcrystalline silica phase like agate and chalcedony, respectively.

Osváth, Zsófia, Istvá Fórizs, Máté Szabó, and Bernadett Bajnóczi

2018 Archaeometric Analysis of Some Scythian and Celtic Glass Beads from Hungary. *Archeometriai Műhely* XV(1):29-44; https://www.academia.edu/37294468/ and https://www.researchgate.net/publication/327183610.

On the composition of three Scythian stratified eye beads with bosses from Mezőtúr and two Celtic bobbin beads and one Celtic simple eye bead from Vác-Kavicsbánya using handheld X-ray fluorescence (hXRF), micro-X-ray diffraction (μ-XRD), and electron microprobe analysis (EMPA) methods.

Ottenwelter, Estelle, Jiří Děd, and Ludmila Barčaková

2014 Technical Study of Jewellery from the Lumbe Garden Cemetery at Prague Castle. In *Castrum Pragense 12. Cemetery in the Lumbe Larden at Prague Castle. Part II. Studies,* edited by Jan Frolík, pp. 163-287. Prague. https://www.academia.edu/20798546/.

Investigates the composition, construction, and decorative techniques of various metal ornaments including hollow spherical pendants with and without enamel inlays (*gombiky*) and beads. Czechia.

Palomar, T., J. Peña-Poza, and J.F. Conde

2009 Cuentas de vidrio prerromanas y arqueometría: una valoración de los trabajos realizados en la Península Ibérica / Pre-Roman Glass Beads and Archaeometry: An Assessment of the Works Carried Out in the Iberian Peninsula. *Zephyrus* LXIV:53-62; https://www.academia.edu/1887839/.

Reviews chemical analyses carried out on glass beads dating to the 4th-1st millennia BC from sites in the northeastern portion of the Iberian Peninsula to assess their quality and utility in determining technological patterns and geographical areas of provenience.

Panagiotaki, Marina

2008 The Technological Development of Aegean Vitreous Materials in the Bronze Age. In *Vitreous Materials in the Late Bronze Age Aegean,* edited by Caroline M. Jackson and Emma C. Wager, pp. 34-63. Sheffield Studies in Aegean Archaeology 9.

Concentrating primarily on vitreous materials (including beads) held by the Heraklion Museum in Crete, this study involves: 1) analytical work; 2) conservation; 3) replication, using local raw materials; and 4) macroscopic examination of all vitreous materials artifacts.

Panagiotaki, Marina, Yannis Maniatis, and Mike Tite

2020 Aegean Vitreous Materials of the Bronze Age: Technological Transfer and Local Innovation. In *Cutting-Edge Technologies in Ancient Greece. Materials Science Applied to Trace Ancient Technologies in the Aegean World*, edited by Marina Panagiotaki, Ilias Tomazos, and Fotios Papadimitrakopoulos, pp. 89-95. Oxbow Books, Oxford. https://www.researchgate.net/publication/357146403.

Traces the contribution of Bronze Age Aegean vitreous-materials artisan/pyrotechnologist to ancient technology, based on compositional analysis and replication experiments.

Panagiotaki, Marina, Mike Tite, and Yannis Maniatis

2015 Egyptian Blue in Egypt and beyond: The Aegean and the Near East. In *Proceedings of the Tenth International Congress of Egyptologists, University of the Aegean, Rhodes, 22-29 May 2008*, edited by P. Kousoulis and N. Lazaridis, pp. 1769-1789. Orientalia Lovaniensia Analecta 241. https://www.researchgate.net/publication/317687861.

Identifies possible production centers of Egyptian blue during the Bronze Age by comparing the results of analytical work performed on Egyptian-blue artifacts from the Aegean with those from

Egypt and the Near East, concentrating especially on the alkali flux used in the production of Egyptian blue.

Panei, Liliana, Gilberto Rinaldi, and Maurizio Tosi

2005 Investigations on Ancient Beads from the Sultanate of Oman (Ra's al-Hadd – Southern Oman). *ArchéoSciences* 29:151-155; https://www.researchgate.net/publication/30463402.

Discusses the mineralogical composition of the recovered stone (heat-hardened steatite) beads and the technology used in their production.

Panich, Lee M., Laure Dussubieux, Tsim D. Schneider, Christopher Canzonieri, Irenne Zwierlein, Christopher Zimmer, and Michelle Zimmer

2022 Compositional Analysis of Compound Drawn White Glass Beads from Colonial California: Implications for Chronology and Dispersal. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 119-136. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.11.

Analysis of a sample of 70 beads from three colonial contexts dating from 1786 to 1870 suggests a relatively late (ca. 1840) introduction of lead-glass white beads using arsenic opacifiers into the region, as well as some potentially meaningful differentiation among the more common antimony-opacified soda-lime glass beads found at all three sites.

Pankiewicz, Aleksandra and Sylwia Siemianowska

2018 The Problem of the Functioning of an Early Medieval Glass Workshop within the Niemcza Settlement Complex. *Przegląd Archeologiczny* 66:237-260; https://www.academia.edu/38133138/.

Archaeological evidence indicates that a glassworks existed in southwestern Poland that produced glass beads, among other things. Extensive compositional analysis of the recovered glass. In Polish with English abstract.

Pankiewicz, Aleksandra, Sylwia Siemianowska, and Krzysztof Sadowski

2017 *Wczesnośredniowieczna biżuteria szklana z głównych ośrodków grodowych Śląska (Wrocław, Opole, Niemcza)* [Early Mediaeval Glassjewellery from Main Silesian Stronghold Complexes (Wrocław, Opole, Niemcza)]. In pago Silensi. Wrocławskie studia wczesnośredniowieczne 3; https://www.academia.edu/34505921/.

Presents a detailed catalog of the recovered glass beads with chemical compositions. Poland.

Paulsson, Bettina, Serge Cassen, Carlos Rodríguez-Rellán, António Carvalho, Jean-Sebastien Vaquer, Miguel Montaña, Josep Argilagós, and Mònica Poveda

2019 The Time of Callaïs: Radiocarbon Dates and Bayesian Chronological Modelling. In *La parure en callaïs du Néolithique européen*, edited by Guirec Querré, Serge Cassen, and

Emmanuelle Vigier, pp. 479-507. Archaeopress, Oxford. https://www.academia.edu/40957155/.
Presents the results of a Bayesian statistical analysis of 406 currently available radiocarbon dates from variscite and turquoise (callaïs) contexts in Europe, along with the results of provenience analyses, undertaken to investigate the fine-grained temporal pattern for the exploitation, circulation, and deposition of callaïs artifacts, such as beads and pendants, during the Neolithic period.

Paynter, Sarah

2023 'For the Want of Them may Ruin a Voyage': Analysis of Glass Beads from Channel Wrecks, Including the Dutch East India Company *retourschip Rooswijk*. *International Journal of Nautical Archaeology*; DOI: 10.1080/10572414.2022.2159722.

The *Rooswijk*, wrecked in 1740, and an unidentified vessel known as the Bead Wreck carried drawn lead-glass beads which are found mainly in 17th- and 18th-century contexts.

Paynter, Sarah and Caroline M. Jackson

2022 Investigating Late Bronze Age Glass Beads from Stotfold, Bedfordshire, UK. *Heritage* 5(2):634-645; https://mdpi-res.com/d_attachment/heritage/heritage-05-00035/article_deploy/heritage-05-00035-v2.pdf.

Analyses of 17 annular transparent blue glass beads and one cylindrical glass bead with opaque grey-white decoration revealed they are made of low-magnesium/high-potassium (LMHK) glass of the type prevalent in Europe between ca. 1200 and 900 BC.

Peake, James R.N.

2012 The Technology and Composition of Anglo-Saxon Glass Beads from Eriswell, Suffolk. Poster, 39th International Symposium on Archaeometry (ISA2012). https://www.academia.edu/1896366/.

SEM-EDXA analysis of approximately 400 beads has shed new light on the production technology of certain colors, most notably red glass, as well as chronological and typological variations in technology relating to particular types and colors of bead produced during the early medieval period. United Kingdom.

2013 Early Anglo-Saxon Glass Beads: Composition and Origins Based on the Finds from RAF Lakenheath, Suffolk. Ph.D. thesis. Cardiff University.

Reports upon the compositional analysis of early Anglo-Saxon (5th-7th centuries AD) glass beads from a cemetery complex at Eriswell, Suffolk, England. Major element analysis was undertaken using energy-dispersive X-ray spectrometry in the scanning electron microscope (SEM-EDS) on 537 samples from a total of 380 monochrome and polychrome beads. Restricted to repository staff.

Peake, James R.N. and Ian C. Freestone

2012 Cross-Craft Interactions between Metal and Glass Working: Slag Additions to Early Anglo-Saxon Red Glass. In *Integrated Approaches to the Study of Historical Glass - IAS12*, edited by Hugo Thienpont, Wendy Meulebroeck, Karin Nys, and Dirk Vanclooster. Proc. of SPIE 8422, 842204; doi:10.1117/12.973765.

SEM-EDS analysis of glass beads from the early Anglo-Saxon cemetery complex at Eriswell, south-eastern England, has provided further insights into the production and technology of opaque red glass.

2014 Opaque Yellow Glass Production in the Early Medieval Period: New Evidence. In *Neighbours and Successors of Rome,* edited by Daniel Keller, Jennifer Price, and Caroline Jackson, pp. 15-21. Oxbow Books, Oxford. https://www.academia.edu/7192615/.

Among the objects analyzed using SEM were several beads dating to the 5th-7th centuries from the Anglo-Saxon cemetery at Eriswell, Suffolk, England.

Peche-Quilichini, Kewin, Ludovic Bellot-Gurlet, Eleonora Canobbio, Joseph Cesari, Bernard Gratuze, Franck Leandri, Céline Léandri, Paul Nebbia, and Céline Paris

2016 Campu Stefanu (Sollacaro, Corsica). Middle Bronze Age Amber and Glass Beads Analyses. A New Evidence for Mycenaean Connection in Corsica? *Fontes Archaeologici Posnanienses* 52:67-79.

Analysis of the components of a late Iron Age necklace revealed that the amber originated in the Baltic region while the raw materials for the glass specimens came from the Near East.

Peche-Quilichini, Kewin, Joseph Cesari, Franck Leandri, Ludovic Bellot-Gurlet, Eleonora Canobbio, Bernard Gratuze, Céline Leandri, and Céline Paris

2016 Étude de provenance et implications économico-culturelles des parures vitreuses et résineuses du Bronze moyen de l'abri 1 de Campu Stefanu (Sollacaro, Corse-du-Sud). *ArchéoSciences* 40:65-81.

In a natural shelter at Campu Stefanu, Corsica, the Middle Bronze Age levels yielded a necklace composed of vitreous and resinous beads. Radiocarbon dating indicates these artifacts were deposited during the 13th century BC (last part of the Middle Bronze Age). LA-ICP-MS analysis of the glass beads indicates a Mesopotamian origin of the raw glass.

Pernicka, Ernst

2020 Lead Isotope Ratios and the Provenance of Medieval Silver. A Comment on "Archaeometric Studies on Early Medieval Silver Jewellery from Central and Eastern Europe" by Ewelina Miśta-Jakubowska, Renata Czech Błońska, Władysław Duczko, Aneta M. Gójska, Paweł Kalbarczyk, Grzegorz Żabiński, Krystian Trela. Archaeol. Anthropol. Sci. 11 (12), 6705-6723. *Archaeological and Anthropological Sciences* 12, Article 165; https://www.academia.edu/43622912/.

Points out flaws in the article by Miśta-Jakubowska et al. (2019).

Pickard, Catriona and Ulf-Dietrich Schoop

2013 Characterization of Late Chalcolithic Micro-Beads from Çamlıbel Tarlası, North-Central Anatolia. *Archaeometry* 55(1):14-32.

Analysis revealed that the beads were made from three distinctive materials; namely, bulk talc (i.e., synthetic enstatite precursor), apatite, and mineral-rich clay pastes. Turkey.

Pinto, J., A.C. Prieto, J.C. Coria-Noguera, C. Sanz-Minguez, and J. Souto

2020 Investigating Glass Beads and the Funerary Rituals of Ancient Vaccaei Culture (S. IV-I BC) by Raman Spectroscopy. *Journal of Raman Spectroscopy*; https://www.academia.edu/95509826/.

Reports on the composition of glass beads recovered from the site of Pintia (Padilla de Duero, Valladolid, Spain).

Pion, Constantin and Bernard Gratuze

2016 Indo-Pacific Glass Beads from the Indian Subcontinent in Early Merovingian Graves (5th-6th Century AD). *Archaeological Research in Asia* 6:51-64; https://www.academia.edu/96926817/.

Discusses the technological, typological, and chemical characteristics of the beads.

Pitarch Martí, Africa, Yi Wei, Xing Gao, Fuyou Chen, and Francesco d'Errico

2017 The Earliest Evidence of Coloured Ornaments in China: The Ochred Ostrich Eggshell Beads from Shuidonggou Locality 2. *Journal of Anthropological Archaeology* 48:102-113.

Analysis of six beads dated to ca. 31 kyr cal BP which exhibit well-preserved red pigment residues indicates that they are intentionally colored body ornaments. This is the earliest evidence from East Asia of a communication technology (the production of artificially colored beads) that has allowed humans to further complexify the messages conveyed by personal ornaments, and associate, to some extent, the performance characteristics of beads and pigment.

Plahter, Unn

2011 Analyses of Jet-Like Objects. In *Things from the Town: Artefacts and Inhabitants in Viking-Age Kaupang,* edited by Dagfinn Skre, pp. 129-141. Kaupang Excavation Project Publication Series 3. Norske Oldfunn XXIV. https://www.academia.edu/35360913/.

Beads are among the items analyzed from a market town in southern Norway.

Plouin, S., M.-P. Koenig, and B. Gratuze

2012 Les perles en verre de l'âge du Bronze d'Alsace et de Lorraine. In *Le Verre en Lorraine et dans les régions voisines,* edited by Véronique Arveiller and Hubert Cabart, pp. 11-36. Monographies Instrumentum 42.

On the Bronze Age glass beads of Alsace-Lorraine, France. Includes chemical data.

Polikreti, Kyriaki, Joanne M.A. Murphy, Vasilike Kantarelou, and Andreas Germanos Karydas

2011 XRF Analysis of Glass Beads from the Mycenaean Palace of Nestor at Pylos, Peloponnesus, Greece: New Insight Into the LBA Glass Trade. *Journal of Archaeological Science* 38(11):2889-2896; https://www.academia.edu/11746197/.

Aims to identify the technology and source for the glass beads found at the Palace of Pylos and thus to ascertain how it was connected to the broader Mycenaean and Mediterranean economies. The presented data support the hypothesis that Pylos was receiving foreign-produced glass via internal Greek trade routes during the Late Bronze Age.

Polla, A., I. Angelini, G. Artioli, P. Belliantani, and A. Dore

2008 Archaeometric Investigation of Early Iron Age Glasses from Bologna. In *Proceedings of the 37th International Symposium on Archaeometry, 13th-16th May 2008, Siena, Italy*, edited by Isabella Turbanti-Memmi, pp. 139-144. Springer.

Presents the results of the chemical analysis of an assortment of glass beads from Villanovian graves in Bologna, Italy, dating to the 9th-7th centuries BC.

Pomberger, Beate Maria, Karina Grömer, Jörg Mühlhans, and Dan Topa

2020 Schlitzbommeln und Anhänger – Klingender Trachtschmuck aus der Býčí skála-Höhle bei Brünn. *Mitteilungen der Anthropologischen Gesellschaft in Wien (MAGW)* 150:215-242; https://www.researchgate.net/publication/347034009.

Several caged balls and rectangular pendants with jingle bobs from an Iron Age sacrificial cave site near Brno in the Moravian Karst, Czechia, were investigated with regard to their metallurgical composition, acoustics, psychoacoustics, and effect on human hearing.

Popelka, Rachel S., Michael D. Glasscock, Peter T. Robertshaw, and Marilee Wood

2005 Laser Ablation-ICP-MS of African Glass Trade Beads. In *Laser Ablation ICP-MS in Archaeological Research,* edited by Robert J. Speakman and Hector Neff, pp. 85-93. University of New Mexico Press, Albuquerque.

Surveys the results of the analysis of glass beads recovered from sites in Egypt, Botswana, Zambia, South Africa, and Sri Lanka.

Poulin, Jennifer Anne and Kate Helwig

2016 The Characterisation of Amber from Deposit Sites in Western and Northern Canada. *Journal of Archaeological Science: Reports* 7(155-168).

Twelve distinct amber specimens from 11 deposit sites in Canada were studied in order to determine their subclass and other distinguishing chemical features. Amber beads recovered from three Thule sites in the Canadian arctic were then compared to these to determine their likely place of origin.

Pozo, M., J. Casas, and J.A. Medina

2002 Estudio mineralógico de componentes ornamentales pétreos procedentes de un yacimiento de la Cultura del Argar (Fuente Álamo, Almería) [Mineralogical Study of Stony Implements Sourced in an Argaric Culture Site (Fuente Álamo, Almería)]. *Boletín Geológico y Minero* 113(2):131-142.

On the chemical composition and likely source of stone objects from an Early Bronze Age site in southern Spain. Includes beads of variscite, muscovite, chlorite, fluorite, and quartz.

Prasad, Ravi, V.N. Prabhakar, and Vikrant Jain

2017 Geological Aspects of Raw Materials for Stone Beads. In *Stone Beads of South and Southeast Asia: Archaeology, Ethnography and Global Connections*, edited by Alok Kumar Kanungo, pp. 115-126. Indian Institute of Technology, Gandhinagar.

Přichystalová, Renáta and Jindřich Štelcl

2016 Glass Beads from Southern and North-Eastern Suburbs of Pohansko Stronghold. Similarities and Differences in their Chemical Composition. Poster, History of Glass Conference, Part II. Glass Beads and Technologies, Bratislava. https://www.academia.edu/28916047/.

On the composition of drawn beads from graves in Moravia, Czechia, dated to the turn of the 9th and 10th centuries.

Přichystalová, Renáta, Jindřich Štelcl, and Václav Vávra

2011 Chemické složení raně středověkých skleněných korálků z jižního předhradí velkomoravského hradiska Břeclav-Pohansko [Chemical Composition of Early Medieval Glass Beads from the Southern Part of the Stronghold at Břeclav-Pohansko]. *Geologické výzkumy na moravě a ve slezsku* 2:187-190; https://www.academia.edu/1618042/.

Czech Republic.

2014 Glass Beads and Buttons from the Southern Suburb of the Břeclav-Pohansko Stronghold. *Journal of Glass Studies* 56:37-59; https://www.academia.edu/9270427/.

A variety of glass beads, including segmented foil beads, was found in graves attributed to the 9th century in the Czech Republic. Includes chemical analyses.

Prinsloo, Linda C.

2008 Micro-Raman Spectroscopy of Nanomaterials: Applications in Archaeology. Ph.D. dissertation. Department of Physics, University of Pretoria.

Chapter 4 reports on "A Raman Spectroscopic Study of the Mapungubwe Oblates: Glass Trade Beads Excavated at an Iron Age Archaeological Site in South Africa." *See* also Prinsloo and Colomban (2008).

Prinsloo, Linda C. and Philippe Colomban

2008 A Raman Spectroscopic Study of the Mapungubwe Oblates: Glass Trade Beads Excavated at an Iron Age Archaeological Site in South Africa. *Journal of Raman Spectroscopy* 39(1):79-90; https://www.academia.edu/15107191/.

A profile of the glass technology used to produce the Mapungubwe oblates, small trade beads from the "royal burials" on Mapungubwe hill was determined and quite a few unique characteristics of the beads may eventually help to establish their provenance.

Prinsloo, Linda C., Aurélie Tournié, and Philippe Colomban

2011 A Raman Spectroscopic Study of Glass Trade Beads Excavated at Mapungubwe Hill and K2, Two Archaeological Sites in Southern Africa, Raises Questions about the Last Occupation Date of the Hill. *Journal of Archaeological Science* 38(12):3264-3277; https://www.academia.edu/15107190/.

Reports on the analysis of 175 glass trade beads from two archaeological sites in the Limpopo valley, South Africa. Using Raman spectroscopy, the glass matrix was classified into two main sub-groups. Seven pigments or chromophores were identified. Some pigments were manufactured after the 13th century. This conflicts with the last occupation date (AD 1290) of the site obtained by carbon dating.

Purowski, Tomasz

2008 Badania techniki wyrobu paciorków szklanych okresu halsztackiego metodami petrograficznymi [Petrographic Methods in the Study of Hallstatt Glass Bead Manufacturing Techniques]. *Archeologia Polski* LIII(1):7-24.

The examination of petrographic thin sections of five glass beads from the Wicina stronghold have demonstrated beyond doubt the usefulness of the method in determining beadmaking techniques attributed to the Halstatt period. English summary.

2008 Problemy badań wyrobów szklanych znanych ze stanowisk kultury łużyckiej na przykładzie pracy J.T. Matysiaka i T. Prokopa (2005) [Questions Concerning Research on Glass Products from Sites of Lusatian Culture in the Wake of a Study by J.T. Matysiak and T. Prokop (2005)]. *Archeologia Polski* LIII(2):337-348.

The author points out errors in the description and interpretation of a glass bead from a site in Poland and points out what is needed for the proper description of beads and the interpretation of the results of chemical composition analyses.

2010 Paciorki szklane zdobione linią zygzakowatą odkryte w międzyrzeczu Odry i Wisły na stanowiskach z wczesnej epoki żelaza [Glass Beads with Zigzag Ornament Discovered on Sites from the Early Iron Age in the Interfluve of the Oder and Vistula Rivers]. *Archeologia Polski* LV(1-2):23-88.

A thorough study of the beads recovered from 89 archaeological sites in Poland including classification, chemical composition, and manufacturing techniques. In Polish with substantial English summary.

2013 Wyroby ze szkła i „szklistego fajansu" odkryte na cmentarzysku kultur łużyckiej i regionalnej grupy kręgu halsztackiego w Domasławiu, pow. wrocławski [Glass and "Glassy Faience" Products from a Cemetery in Domasław, Wrocław District, Attributed to Lusatian Culture and a Local Province of the Hallstatt Culture]. *Archeologia Polski* LVIII(1-2):23-87.

Describes beads excavated in western Poland and investigates their chemical composition. Detailed English summary.

2014 Bursztynowy rozdzielacz i szklane paciorki odkryte w obiektach kultury łużyckiej w Targowisku, pow. wielicki [An Amber Spacer Bead and Glass Beads Discovered at Lusatian Culture Features in Targowisko, the Wieliczka District]. In *Via Archaeologica: Źródła z badań wykopaliskowych na trasie autostrady A4 w Małopolsce*, pp. 289-306. Kraków.

Provides descriptions of the beads as well as their chemical composition. Poland. English summary.

2016 Kolia szklanych paciorków z cmentarzyska w Legnicy [The Necklace of Glass Beads from the Cemetery in Legnica]. In *Metalurdzy znad kaczawy: Cmentarzysko ciałopalne z Epoki Brązu,* edited by Kamila Nowaka and Tomasza Stolarczyka, pp. 67-74. Muzeum Miedzi w Legnicy, Legnica.

Reports the chemical composition of two Bronze Age beads excavated in Legnica, Poland. They were probably made in production centers in the area of the River Po Plain. In Polish with English summary.

2022 Identifying Bronze Age Glass Production Centres through Bead Making Techniques. *Archeologia Polski* LXVII:61-80; https://www.academia.edu/96646748/.

Discusses the chemical composition, production technology, and form of Bronze Age glass beads found in the territory of present-day Poland.

Purowski, T., P. Dzierżanowski, E. Bulska, B. Wagner B., and A. Nowak

2012 A Study of Glass Beads from the Hallstatt C-D from Southwestern Poland: Implications for Glass Technology and Provenance. *Archaeometry* 54(1):144-166.

Recovered from sites of the Lusatian culture, the beads were analyzed by EPMA and LA-ICP-MS.

Purowski, T., L. Kępa, and B. Wagner

2016 Glass on the Amber Road: The Chemical Composition of Glass Beads from the Bronze Age in Poland. *Archaeological and Anthropological Sciences*; doi:10.1007/s12520-016-0443-8.

Two groups were distinguished based on a comparison of the MgO to K_2O ratio in glass: 1) high magnesium glass (HMG) - 23; and 2) low magnesium and high potassium glass (LMHK) - 33 (29 matrix glass specimens and 4 decorative).

Purowski, T., A. Nowak, E. Bulska, and B. Wagner

2015 Chemical Composition Analysis of the Glass of a Horned Eye-Bead from Lubień. *Archaeologia Polona* 48:167-174.

Analysis revealed that the bead found in a grave which was part of an early medieval cemetery in Lubień, Poland, can be claimed to have been manufactured during the Hallstatt D period.

Purowski, T., A. Nowak, and B. Wagner

2015 Badania składu chemicznego szkła paciorków z cmentarzyska z wczesnej epoki żelaza w Modlnicy [The Examination of the Chemical Composition of the Glass from the Beads Discovered in the Early Iron Age Cemetery at Modlnica]. In *Modlnica, stan. 5 – od późnej epoki brązu po czasy średniowiecza,* edited by Karol Dzięgielewski, Agata Sztyber, Magdalena Dzięgielewska, pp. 239-254. Wydawnictwo Via Archeologica, Kraków.

The physico-chemical examination of two beads has demonstrated that the glasses from Modlnica (Poland) have close analogies among 7th-6th century BC materials known from the North Pontic zone.

Purowski, Tomasz, Olga Syta, and Barbara Wagner

2019 Mycenaean and Egyptian Faience Beads Discovered in Southern Poland. *Journal of Archaeological Science: Reports* 28:102023.

Reports on the composition of four faience beads discovered in graves dated to roughly 1600-1100 BCE.

2020 Between East and West: Glass Beads from the 8th-3rd Century BC from Poland. *Archaeometry*; https://doi.org/10.1111/arcm.12563.

Discusses the chemical composition of glass beads from 20 archaeological sites in Poland that date to Hallstatt C to early La Tène (about 800/750-260/250 BC).

Purowski, Tomasz and Barbara Wagner

2015 Badania składu chemicznego szkieł odkrytych na osadzie kultury lateńskiej w podłężu koło Krakowa [Chemical Analyses of Glass from the Settlement of the La Tène Culture in Podłęże near Kraków]. *Przegląd Archeologiczny* 63:125-146.

Beads were included in the study. English abstract.

Purowski, Tomasz, Barbara Wagner, Ewa Bulska, Olga Syta, and Piotr Dzierżanowski

2014 Glassy Faience from the Hallstatt C Period in Poland: A Chemico-Physical Study. *Journal of Archaeological Science* 50:288-304.

Beads and pin heads made of glassy faience, often decorated with true glass, discovered at seven different cemetery sites in Poland and dated chiefly to the Hallstatt C period (ca. 750/700-600 BC), are examined by the LA-ICP-MS and EPMA methods.

Putsadee, Rodcharoen and Tanongsak Lerdpipatworakul

2021 The Study of Glass Beads from Late Prehistoric to Early Historic Sites in Central Thailand. *Journal of Anthropology, Sirindhorn Anthropology Centre* 4(2):143-185; https://so06.tci-thaijo.org/index.php/jasac/article/view/250373.

Discusses the physical attributes of the beads as well as their chemical composition. In Thai with English abstract.

Putzgruber, E., M. Verità, K. Uhlir, B. Frühmann, M. Griesser, and G. Krist

2012 Scientific Investigation and Study of the Sixteenth-Century Glass Jewellery Collection of Archduke Ferdinand II. *Studies in Conservation* 57(sup. l):S217-S226. https://doi.org/10.1179/2047058412Y.0000000027.

Provides information concerning the chemical composition of some of the pieces in the 16th-century glass jewelry collection of Archduke Ferdinand II which includes necklaces composed of decorated blown beads and chains formed of interconnected wound ring beads.

Qin, Ying, Lingzhu She, Xiaoli Li, and Jianxun Huang

2009 Composition and Structure of Warring States Period Glasses from Tomb Number Two at the Leigudun Site of Shuizou County, Hubei Province, China. *Journal of the Chinese Ceramic Society* 4.

The glass beads belong to the CaO-Na_2O-SiO_2 system, with higher composition of Sb_2O_3 and the Cu and Fe ions as the main coloring elements, and a glass tube belongs to the K_2O-SiO_2 system. In Chinese.

Queffelec, Alain, Ludovic Bellot-Gurlet, Eddy Foy, Yannick Lefrais, and Emmanuel Fritsch

2021 First Identification of Sudoite in Caribbean Ceramic-Age Lapidary Craftsmanship. *Gems & Gemology* 57(3); https://www.gia.edu/gems-gemology/fall-2021-first-identification-sudoite.

Exhaustive analysis of archaeological beads and pendants from the French islands of the Lesser Antilles has revealed a green lapidary material used for the production of nine artifacts from five archaeological sites: sudoite.

Querré, Guirec, Thomas Calligaro, and Serge Cassen

2019 Origine des bijoux néolithiques en Callaïs de l'ouest de la France. In *La parure en callaïs du Néolithique européen*, edited by Guirec Querré, Serge Cassen, and Emmanuelle Vigier, pp. 129-200. Archaeopress, Oxford.

A large group of beads and pendants in *callaïs* from 27 Neolithic occupations in northern France were analyzed by PIXE to determine their mineralogical nature and provenance.

Querré, Guirec, Thomas Calligaro, Serge Cassen, Marie-Pierre Dabard, and Salvador Domínguez-Bella

2019 Provenance des parures en variscite du Néolithique européen : élaboration d'un modèle chimiométrique. In *La parure en callaïs du Néolithique européen*, edited by Guirec Querré, Serge Cassen, and Emmanuelle Vigier, pp. 105-128. Archaeopress Publishing, Summertown, Oxford.

Determining the provenience of European Neolithic ornaments made of variscite using an elaboration of a chemometric model.

Querré, Guirec, Thomas Calligaro, Serge Cassen, and Salvador Domínguez-Bella

2019 Long Distance Provenances of Jewelry (Variscite & Turquoise) along Atlantic Europe during the Neolithic (5th -3rd millenium) Based on PIXE Analysis. In *A Taste for Green: A Global Perspective on Ancient Jade, Turquoise and Variscite Exchange*, edited by Carlos Rodríguez-Rellán, Ben A. Nelson, and Ramón Fábregas Valcarce, pp. 121-140. Oxbow Books, Oxford.

Sources the green-stone beads and pendants deposited in the large grave mounds in Brittany, France.

Querré, Guirec, T. Calligaro, S. Domínguez-Bella, and S. Cassen

2014 PIXE Analyses Over a Long Period: The Case of Neolithic Variscite Jewels from Western Europe (5th-3th millennium BC). *Nuclear Instruments and Methods in Physics Research B* 318:149-156.

Analysis of archeological variscite beads and pendants excavated in Spain, Portugal, and France and of variscite geological references samples from European occurrences were carried out in order to trace the circulation of this precious gemstone over three millennia.

Querré, Guirec, Salvador Domínguez-Bella, and Serge Cassen

2012 La variscite ibérique: exploitation, diffusion au cours du néolithique. In *Roches et sociétés de la Préhistoire,* edited by Grégor Marchand et Guirec Querré, pp. 307-315. Presses Universitaires de Rennes.

Presents analytical results derived from the study of variscite beads from two megalithic sites: one in the province of Cadiz, southwest Spain, and the other on the coast of Morbihan in Brittany, France. The results confirm the existence of long-distance transport from the geological source areas to the archaeological sites where they were deposited.

Querré, Guirec, F. Herbault, and T. Calligaro

2008 Transport of Neolithic Variscites Demonstrated by PIXE Analysis. *X-Ray Spectrom* 37:116-120.

The analysis of mostly green beads from the large grave mounds in the Carnac region in Brittany reveals they are variscite and originated from the Iberian Peninsula.

Raad, Danielle and Cheryl A. Makarewicz

2019 Application of XRD and Digital Optical Microscopy to Investigate Lapidary Technologies in Pre-Pottery Neolithic Societies. *Journal of Archaeological Science: Reports* 23:731-745.

Investigates raw material selection and bead manufacture at the PPN settlement of el-Hemmeh, Jordan.

Rădvan, R, C. Borş, and L. Ghervase

2016 Portable X-Ray Fluorescence Investigation of Certain Bronze Beads of Hoard Tărtăria I and their Specific Corrosion. *Romanian Journal of Physics* 61(9-10):1530-1538; www.nipne.ro/rjp/2016_61_9-10/RomJPhys.61.p1530.pdf.

Examines the corrosion layer of several beads made of ternary bronze alloys from a site in Romania.

Ragazzi, E., Guido Roghi, Aurelio Giaretta, and Piero Gianolla

2003 Classification of Amber Based on Thermal Analysis. *Thermochimica Acta* 404(1/2):43-54.

Ambers of the same age may have differing chemical compositions. This study attempts to evaluate amber using thermal analysis; detecting changes in weight in a sample when heated in controlled conditions. It concludes that thermal analysis provides an additional way to characterize fossil resins.

Rahman, Nur Qahirah Abdul, Zuliskandar Ramli, Azimah Hussin, Muhamamad Nu'Man Mohd Nasir, Nur Sarahah Mohd Supian, and Hossein Sarhaddi Dadian

2019 Elemental Analysis by Field-Emission Scanning Electron Microscope of Ancient Glass Beads Sample from Pulau Kalumpang Archaeological Site, (Perak, Malaysia). *Mediterranean Archaeology and Archaeometry* 19(1):93-106; https://www.academia.edu/72991372/.

Analysis of 17 beads from a 2nd-century site revealed a composition high in silica (52.0-78.0%), aluminum (9.0-20%), and sodium (3.0-19.0%), a key feature of South East Asia's Indo-Pacific glass beads.

Rahman, S.A., M.S. Hamzah, A.K. Wood, M.S. Elias, and K. Zakaria

2008 INAA of Ancient Glass Beads from Sungai Mas Archaeological Site, Bujang Valley, Malaysia. *Journal of Radioanalytical and Nuclear Chemistry* 278(2):271-276.

Reports the multi-elemental content of 16 glass beads and 8 glass samples dating from the 5th-14th centuries.

Ramli, Zuliskandar and Zakaria Kamaruddin

2008 Kajian komposisi manik dan bahan manik Indo-Pasifik yang ditemui di Kampung Sungai Mas (Tapak 32), Kota Kuala Muda, Kedah. In *Arkeologi dan Sejarah*, edited by Abdullah

Zakaria and Jazamuddin Baharuddin, pp, 95-131. Persatuan Muzium Malaysia, Kuala Lumpur.
On the composition of Indo-Pacific glass beads found at Kampung Sunagi Mas (Site 32), Kota Kuala Muda, Kedah, Malysia. In Malay.

Ramli, Zuliskandar and Nik Hassan Shuhaimid Nik Abdul Rahman
2009 Beads Trade in Peninsula Malaysia. Based on Archaeological Evidences. *European Journal of Social Sciences* 10(4):585-593.

Ramli, Zuliskandar, Nik Hassan Shuhaimi Nik Abdul Rahman, Sharifah Nur Izzati Sayed Hasan, Ros Mahwati Ahmad Zakaria, Mohd Rohaizat Abdul Wahab, Norlelawaty Haron, and Hasnira Hassan
2014 Sungai Mas, Kuala Selinsing dan Santubong: Pusat Pengeluaran Manik Kaca Indo-pasifik di Asia Tenggara pada Zaman Proto-sejarah (Sungai Mas, Kuala Selinsing and Santubong: The Center for Indo-Pacific Glass Bead Manufacturing in Southeast Asia in the Proto-Historic Age). In *Isu-isu Sains & Teknologi Di Alam Melayu*, edited by Abdul Latif Samian and Nazri Muslim, pp. 370-391. Institut Alam dan Tamadun Melayu Universiti Kebangsaan Malaysia, Bangi.
Includes information about the chemical composition of the beads. In Malay.

Ramli, Zuliskandar, Nik Hassan Shuhaimi Nik Abdul Rahman, and Adnan Jusoh
2012 Sungai Mas and OC-EO Glass Beads: A Comparative Study. *Journal of Social Sciences* 8(1):22; https://www.academia.edu/76276644/.
Compositional analysis reveals that Sungai Mas, Malysia, and OC-EO, Vietnam, produced their own Indo-Pacific beads and they were two of the Indo-Pacific beadmaking centers in Southeast Asia from the 2nd to the 13th century CE.

Ramli, Zuliskandar, Nik Hassan Shuhaimi Nik Abdul Rahman, Adnan Jusoh, and Yunus Sauman
2011 Some Observations on Glass Beads Composition in Sarawak, Singapore and Peninsula Malaysia. *Sari: International Journal of Malay World Studies* 29(2):3-20; https://www.academia.edu/70344561/.
Compares the compositional data of Sarawak glass beads with that obtained from glass beads from Kuala Selinsing, Fort Canning, Singapore, and Sungai Mas, Kedah.

Ramli, Zuliskandar, Nik Hassan Shuhaimi Nik Abdul Rahman, and Abdul Latif Samian
2011 X-Ray Fluorescent Analysis on Indo-Pacific Glass Beads from Sungai Mas Archaeological Sites, Kedah, Malaysia. *Journal of Radioanalytical and Nuclear Chemistry* 287(3):741-747.
The analysis revealed that Sungai Mas produced its own Indo-Pacific beads during the 6th-13th centuries.

Ramli, Zuliskandar, Nur Qahirah Abdul Rahman, Azimah Hussin, Sharifah Nur Izzati Sayed Hasan, and Azharudin Mohamed Dali

2017 Compositional Analysis of Sungai Mas, Kuala Selinsing and Santubong Glass Beads. *Mediterranean Archaeology and Archaeometry* 17(2):117-129; https://www.academia.edu/72991370/.

Reports on the composition of Indo-Pacific glass beads recovered from three ancient port sites in Malaysia, 2nd-11th centuries AD.

Rehren, T. and S. Nixon

2014 Refining Gold with Glass – An Early Islamic Technology at Tadmekka, Mali. *Journal of Archaeological Science* 49:33-41.

Analysis of the glass adhering to crucible fragments found in a goldsmith's workshop and glass beads found in association suggests that the Tadmekka goldsmiths were processing gold using crushed glass beads as a flux, rather than working glass as a material in its own right.

Rehren, Thilo and Edgar Pusch

2007 Glas für den Pharao – Glasherstellung in der Spätbronzezeit des Nahen Ostens. In *Einführung in die Archäometrie*, edited by Günther A. Wagner, pp. 216-235. Springer, Berlin.

On glassmaking during the Late Bronze Age in the Middle East. Of particular interest is the finding that some green glass beads from Ancient Egyptian contexts were once actually ruby red (pp. 220-221).

Reinhardt, Averie, Renfei Feng , Qunfeng Xiao, Yongfeng Hu, and Tsun-Kong Sham

2020 Exploring the Dzi Bead with Synchrotron Light: XRD, XRF Imaging and μ-XANES Analysis. *Heritage* 3(3):1035-1045; https://www.researchgate.net/publication/344845470.

In a novel research project, X-rays from a synchrotron light source are used to determine the chemical composition of a Dzi bead to see if the pattern is natural or man-made and if the bead is genuine or a replica.

Resque Meirelles, Anna Cristina and Marcondes Lima Da Costa

2012 Mineralogy and Chemistry of the Green Stone Artifacts (Muiraquitãs) of the Museums of the Brazilian State of Pará. *Rem Revista Escola de Minas* 65(1):59-64; https://www.researchgate.net/publication/262623749.

Archaeometric analysis of 23 zoomorphic pendants and one bead revealed that most were made of that minerals commonly found in Brazil: quartz, albite, microcline, variscite, anorthite, and tremolite (the equivalent of nephritic jade). Four pieces, however, were made of jadeite (jadeitic jade) which is unknown in the Amazon basin or in other parts of Brazil.

Ribeiro, I.M.N., R.P. Freitas, C. Calza, A.L.C. Oliveira, V.S. Felix, D.S. Ferreira, R.T. Batista, E.A.S. Gonçalves, M.O. Pereira, P.C.L. Brito, T.A. Lima, A.R. Pimenta, M.J. Anjos, and R.T. Lopes

2016 Analysis by Raman Spectroscopy and XRF of Glass Beads from Excavations in the Harbor Area of Rio de Janeiro, Brazil. *Vibrational Spectroscopy* 87:111-115.

Analysis of nine beads utilized by Africans and Afro descendants during the 19th century suggests that they originated in "Italy and China," though the faceted specimens are the likely products of Bohemia.

von Richthofen, Jasper, Flemming Kaul, Bernard Gratuze, and Jeanette Varberg

2017 3.000 Jahre „Globalisierung" in der Oberlausitz? Bronzezeitliche Glasperlen aus einem Brandgrab bei Jänkendorf. *Görlitzer Magazin* 30:70-81.

Discusses the blue glass beads found with a cremation burial of the Middle Bronze Age C of the Lusatian culture in east-central Germany. Chemical analysis indicates the beads are imports from Mesopotamia.

Rick, Torben C., René L. Vellanoweth, and Jon M. Erlandson

2005 Radiocarbon Dating and the Old Shell Problem: Direct Dating of Artifacts and Cultural Chronologies in Coastal and Other Aquatic Regions. *Journal of Archaeological Science* 32(11):1641-1648.

Discrepancies in ^{14}C dates for shell artifacts appear to be due to the use of old shells by humans to make beads and other items, including shells collected from fossil deposits, older archaeological sites, and beaches. The problems caused by the use of old shells to make beads and other artifacts are surmountable through careful sample selection, analysis of multiple ^{14}C dates on a variety of materials, and proper calibration procedures.

Robertshaw, Peter, N. Benco, M. Wood, L. Dussubieux, E. Melchiorre, and A. Ettahiri

2010 Chemical Analysis of Glass Beads from al-Basra (Morocco). *Archaeometry* 52(3):355-379; https://www.academia.edu/6176223/.

Reports the results of elemental analysis, using LA-ICP-MS, of 30 glass beads from an assemblage of beads excavated at medieval al-Basra. Six chemical glass types are represented and their characteristics and geographical origins are discussed, with reference also to the techniques used to make the beads.

Robertshaw, Peter, M.D. Glascock, M. Wood, and R.S. Popelka

2003 Chemical Analysis of Ancient African Glass Beads: A Very Preliminary Report. *Journal of African Archaeology* 1(1):139-146.

Presents the results of the chemical analysis of 156 glass beads from sites in southern Africa using LA-ICP-MS. Almost all of these beads can be grouped in two chemical types based on oxide compositions and glass recipes. Glasses of these types were manufactured in South and/or Southeast Asia. These are the first results of a project that will analyze about 1,000 beads from African archaeological sites.

Robertshaw, Peter, S. Magnavita, M. Wood, E. Melchiorre, R. Popelka-Filcoff, and M. Glascock

2010 Glass Beads from Kissi (Burkina Faso): Chemical Analysis and Archaeological Interpretation. *Journal of African Archaeology* 2:105-118; https://www.academia.edu/56868530/.

Chemical analysis, using LA-ICP-MS, of 37 glass beads from the cemetery of Kissi 13 in Burkina Faso revealed the presence of three main types of glass. Soda-lime-silica glass, manufactured using plant ash as the flux, was the glass type from which almost all the beads were made.

Robertshaw, P., B. Rasoarifetra, M. Wood, E. Melchiorre, R.S. Popelka-Filcoff, and M.D. Glascock

2006 Chemical Analysis of Glass Beads from Madagascar. *Journal of African Archaeology* 4(1):91-109.

Chemical analysis of 31 glass beads from the sites of Mahilaka and Sandrakatsy in Madagascar, which date to approximately the 9th-15th centuries, reveals the presence of two main types of glass: mineral-soda glasses and plant-ash glasses. Most of these glasses were probably made in South Asia.

Robertshaw, Peter, Constanze Weise, Laure Dussubieux, James Lankton, Rachel Popelka-Filcoff, and Michael D. Glascock

2009 Chemical Analysis of Glass from Nupe, Nigeria. *Tribus, Staadiches Museum für Völkerkunde* 58:83-95; https://www.academia.edu/557795/.

Reports the results of the first chemical analyses of the products of the *masagá* glass-working guild resident in Bida (Nupe), Nigeria. The items, including beads, date to the period 1914-2003.

Robertshaw, Peter and Marilee Wood

2017 The Glass Beads from Ingombe Ilede. *Antiquity* 91 (358):1078-1084.

All analyzed beads from burials 3 and 8 at Ingombe Ilede, Zambia, belong to the Khami series produced in India and traded into southern and south-central Africa from the mid-15th to mid-17th centuries. Some beads of an earlier type were present in other graves, and may have been kept as heirlooms.

Robertshaw, Peter, M. Wood, Anne Haour, Karlis Karklins, and Hector Neff

2014 Chemical Analysis, Chronology, and Context of a European Glass Bead Assemblage from Garumele, Niger. *Journal of Archaeological Science* 41:591-604; https://www.academia.edu/19331129/.

Garumele, also known as Wudi, is reputed to have been a capital of the Kanem-Borno "empire," but its date of settlement and occupation remain unclear. To help rectify this situation, a sample of 44 glass beads recovered during excavations were chemically analyzed using LA-ICP-MS. The results indicate that the beads are of European origin, probably Venetian and/or Dutch, and that most belong to the late 17th or 18th century.

Robertshaw, Peter, M. Wood, E. Melchiorre, Rachel S. Popelka-Filcoff, and Michael D. Glascock

2010 Southern African Glass Beads: Chemistry, Glass Sources and Patterns of Trade. *Journal of Archaeological Science* 37(8):1898-1912.

A sample of 360 glass beads from 19 archaeological sites in southern Africa dating between about the 8th and 16th centuries AD were analyzed using LA-ICP-MS, determining 47 chemical elements. The eight different bead series, previously defined on morphological characteristics, possess different glass chemistries. Zhizo series beads of the late 1st millennium AD were probably made from Iranian glass. Later bead series were made of glass probably manufactured in South Asia.

Rojo, M.A., G. Deubes de Castro, M. Edo, and J.L. Fernádez

1996 Adornos de calaíta en los ajuares dolménicos de la provincia de Burgos: apuntes sobre su composición y procedencia. *Rubricatum: Revista del Museu de Gavà* 1:239-250.

Analysis of eight green beads (calaite, a turquoise mineral) excavated at several dolmens at Burgos, Spain, revealed the great mineralogical variety that exists under this generic denomination.

Rolland, Joëlle

2021 *Le verre de l'Europe celtique : Approches archéométriques, technologiques et sociales d'un artisanat du prestige au second âge du Fer.* Sidestone Press, Leiden. https://www.academia.edu/51092032/.

Archaeometric, technological, and social approaches to the study of glass beads and bracelets in Celtic Europe during the second Iron Age.

Rolland, Joëlle and Laurent Olivier

2018 The Discovery of Seven Engraved La Tène Glass Beads from the Sanctuary of Mathay-Mandeure. *Antiquity* 92(364):e6.

LA-ICP-MS analysis of engraved beads from a site in Doubs, France, has refined the chronology for the manufacture of such rare artifacts, and increases our understanding of Late Iron Age ritual deposition practices.

Roman, Deborah V.

2017 New AMS Dating Sequences for the Chumash *Ventureno* Early Period: Revisiting the Question of Antiquity of *Ventureno* Chumash Inland Occupation. *Proceedings of the Society for California Archaeology* 31:181-194.

Presents initial results, including a suite of 20 dates, from three sites (Ven-852, -853, and -1029) in Ventura County that document a well-established occupation sequence including evidence of occupation prior to 9000 cal/bp near the important Late Period ritual site of CA-VEN-632. Shell beads enter into the discussion.

Rösch, C., R. Hock, U. Schüssler, P. Yule, and A. Hannibal

1997 Electron Microprobe Analysis and X-ray Diffraction Methods in Archaeometry: Investigations on Ancient Beads from the Sultanate of Oman and from Sri Lanka. *European Journal of Mineralogy* 9:763-783; https://pubs.geoscienceworld.org/eurjmin/article-abstract/9/4/763/62939/.

Examines stone, glass, metal, Egyptian blue, and synthetic enstatite beads from the Iron Age Samad Culture of Oman and the 4th-century BC site at Tissamahara, Sri Lanka.

Rosenberg, Danny, Yael Elkayam, Yossi Garfinkel, Florian Klimscha, Vesna Vučković, and Yaakov Weiss

2022 Long-Distance Trade in the Middle Chalcolithic of the Southern Levant: The Case of the Olivine Beads from Tel Tsaf, Jordan Valley, Israel. *PloS ONE* 17(8), e0271547; https://www.academia.edu/84512546/.

Discusses the morphometric and technological characteristics, as well as the chemical composition, of eight olivine beads that are postulated to have originated in Ethiopia.

Rosenberg, Danny, Branden Cesare Rizzuto, Florian Klimscha, and Tristan Carter

2022 The Obsidian Beads from Middle Chalcolithic Tel Tsaf (ca. 5,200-4,700 cal. BC), Jordan Valley, Israel: Technology, Provenance, and Socio-Economic Significance. *Archaeological and Anthropological Sciences* 14, 113; https://www.academia.edu/81360209/.

This paper details the obsidian bead assemblage (the richest so far in the southern Levant), its morphometric and technological characteristics, and the raw material sources based on chemical compositions. It then discusses the assemblage's broader socioeconomic significance, and the possible means through which members of the community came to procure the beads.

Roumiantseva, Olga

2007 L'origine du verre de l'epoque des grandes migrations en Russie centrale. http://medieval-europe-paris-2007.univ-paris1.fr/Rumiantseva.pdf, accessed 10 Dec. 2013.

This study focuses on the chemical composition of glass beads containing cobalt. The 42 samples examined are from Migration Period cemeteries located in the Oka and Volga basins in Central Russia.

Rousaki, Anastasia, Alessia Coccato, Charlotte Verhaeghe, Bernard-Olivier Clist, Koen Bostoen, Peter Vandenabeele, and Luc Moens

2015 Combined Spectroscopic Analysis of Beads from the Tombs of Kindoki, Lower Congo Province (Democratic Republic of the Congo). *Applied Spectroscopy* 70(1):76-93.

Micro-Raman spectroscopy and chemometrics on handheld XRF results were used to characterize beads found during archaeological excavations in the Congo. Metallic objects, organogenic materials, and glass beads were studied. The glassy materials seem to be of European production.

Ruiz-Galvez, Marisa, Alicia Perea, Carolina Gutierrez, Hilario Madiquida, Jorge de Torres, Víctor M. Fernandez, and Cezar Mahumane

2021 Quirimbas Islands (Northern Mozambique) and the Swahili Gold Trade. *Journal of Archaeological Science: Reports* 38, art. 102985; https://www.academia.edu/56279858/.

Reports on the archaeometric study (OM, SEM-EDS, and PIXE) of a gold bead recovered on Ibo island and its significance in the historical regional context.

Rumyantseva, Olga

2010 Некоторые особенности распространения бус в Поочье и Окско-Сурском междуречье в эпоху римских влияний и Великого переселения народов. *Early Slavic World* 13:277-300; https://www.academia.edu/23947590/.

Discusses glass beads of the Oka region and the Oka-Sura interfluve area in eastern Russia, late Roman to Migration period. Includes compositional analysis.

2018 Eastern European Enamels of the Bryansk Hoard: Manufacturing Technology and Possible Origin. *Journal of Glass Studies* 60:11-24.

Found in the southwestern part of central Russia and dating to the late 2nd and 3rd centuries, the hoard included flattened prismatic (brick-shaped) beads of opaque red enamel. Their chemical composition is discussed.

Rumyantseva, O.S., A.A. Trifonov, and D.A. Khanin

2018 15.1. The Chemical Composition of Glass Enamel Inserts and Beads. In *Брянский клад украшений с выемчатой эмалью восточноевропейского стиля (III в. н. э.*), edited by A.M. Oblomsky, pp. 199-220. Early Slavic World 18; https://www.academia.edu/40030833/.

Reports on the chemical composition of glass beads and enamels of the Bryansk hoard, an outstanding assortment of eastern European enameled objects found in central Russia that date to the late 2nd and 3rd centuries.

Ruvalcaba Sil, J.L., A. Daneels, M. Vaggi, and M. Aguilar Franco

2010 Non-Destructive Characterization of Green Stone Pieces from La Joya Site, Veracruz, Mexico. In *2nd Latin-American Symposium on Physical and Chemical Methods in Archaeology, Art and Cultural Heritage Conservation. Selected Papers. Archaeological and Arts Issues in Materials Science. Cancun, Mexico 2009*, edited by José Luis Ruvalcaba Sil, Javier Reyes Trujeque, Jesús A. Arenas Alatorre, and Adrián Velázquez Castro, pp. 49-55.

Several green-stone beads and other adornments of the Classic period were analyzed using Raman and Mid-FTIR spectroscopies in order to identify the mineral composition, while PIXE and Ionoluminescence were applied to contribute to the mineral identification and to determine probable provenance.

Ruvalcaba Sil, J.L., E. Melgar Tísoc, J.F. Curado, K. Laclavetine, and T. Calligaro

2013 Caracterización y procedencia de piedras verdes de las ofrendas del Templo Mayor de Tenochtitlan. In *Técnicas analíticas aplicadas a la caracterización y producción de materiales arqueológicos en el Área Maya,* edited by Adrian Velazquez Castro and Lynneth S. Lowe, pp. 163-178. Universidad Nacional Autónoma de México, México, D.F.

On the composition and origin of green-stone offerings (including beads) at Tenochtitlan.

Saitowitz, Sharma J. and David L. Reid

2001 *Early Indian Ocean Glass Bead Trade between Egypt and Malaysia: A Pilot Study.* Indo-Pacific Prehistory Association Bulletin 21. Melaka Papers 5.

Plasma mass spectrometry was used to assess the rare earth trace element content of beads from Egypt and Malaysia. Egyptian beads dating to AD 800-900 were compared to Malaysian beads from the same time period, yielding virtually identical glass recipes. The data shed new light on ancient trade between Egypt and Malaysia.

2001 Physical and Chemical Analysis of Glass Beads and Glassy Slag from Iron Age Sites in Northeast Thailand: Preliminary Findings. In *Australasian Connections and New Directions: Proceedings of the 7th Australasian Archaeometry Conference, University of Auckland,* edited by Martin Jones and Peter Sheppard, pp. 307-327. University of Auckland.

Saitowitz, Sharma J., David L. Reid, and N.J. van der Merwe

1996 Bead Trade from Islamic Egypt to South Africa c. AD 900-1250. *South African Journal of Science* 92:101-104.

Plasma mass spectrometry was used to determine the rare earth element contents of glass beads excavated in the former northern and eastern Transvaal. They were found to be identical with those of beads made in al-Fustat (Old Cairo), and document the existence of a trade link with the Mediterranean via the Red Sea 1000 years ago.

Salisbury, Amy and Ian Glover

1997 New Analyses of Early Glass from Thailand and Vietnam. *Bead Study Trust Newsletter* 30:7-14; https://www.societyofjewelleryhistorians.ac.uk/bead_study_trust.

Analysis of beads from several sites dating to the mid-late 1st millennium BC revealed three basic glass groups: 1) potassium glass, low in calcium and magnesia and variable levels of alumina; 2) soda-lime glass, high in calcium and more alumina and magnesia; and 3) soda glass, lower in calcium and magnesia, but with high alumina.

Salvatori, S., M. Vidale, G. Guida, and E. Masioli

2009 Ilgynly-Depe (Turkmenistan) and the 4th Millennium BC Metallurgy of Central Asia. *Paléorient* 35(1):47-67.

Surface finds include a number of copper beads as well as a silver example. Their production and composition are discussed.

Samek, Lucyna, Maciej Karwowski, Sylwester Czopek, Jerzy Ostachowicz, and Zdzisław Stęgowski

2007 Analysis of Glass Beads from the Graves of the Tarnobrzeg Lusatian Culture in Jasionka and Grodzisko Dolne Employing the X-ray Fluorescence Method. *Analecta Archaeologica Ressoviensia* 2:101-129; https://www.academia.edu/5355512/.

Provides the chemical composition of five glass beads recovered from two sites in southeastern Poland that were occupied during the Late Bronze Age and Early Iron Age.

Saminpanya, Seriwat, N. Bavornyospiwat, S. Homklin, S. Danyutthapolchai, and P. Bupparenoo

2016 Physical and Chemical Properties of the Ancient Glass Beads from the Highland Log-Coffin Culture and the Lowland Areas, Thailand: Considerations on their Colors and Technology. *Journal of Archaeological Science: Reports* 8:366-380.

Discusses drawn beads dating to the 3rd-6th centuries.

Saminpanya, Seriwat, Chatree Saiyasombat, Nirawat Thammajak, Chanakarn Samrong, Sirilak Footrakul, Nichanan Potisuppaiboon, Ekkasit Sirisurawong, Thumrongsak Witchanantakul, and Catleya Rojviriya

2019 Shedding New Light on Ancient Glass Beads by Synchrotron, SEM-EDS, and Raman Spectroscopy Techniques. *Scientific Reports* 9(1):16069; https://www.nature.com/articles/s41598-019-52322-2.

By investigating the coloring elements in ancient beads from sites in Thailand, concludes that the Dvaravati glasses in Southeast Asia may have been imported or technologically transferred to domestic manufacturers during trading on the Silk Road that connected the East and the West.

Sampietro Vattuone, María M., Susana Martínez Stagnaro, Rosario García Giménez, José L. Peña Monné, Jimena Roldán, and Mario G. Maldonado

2017 Graves, Beads, and Trade in Northwest Argentina: A First ED-XRF Characterization of Very Well-Formed Objects. *Arqueología* 23(1):27-43; https://www.academia.edu/64850847/.

ED-XRF analyses of stone beads recovered from a grave located within a Formative residential unit dating to 1560 ± 35 BP revealed that they were made of chrysocolla, variscite, and turquoise, all of which are foreign to the area.

Sánchez, Alberto, José A. Tuñón, David J. Parras, Manuel Montejo, Miguel A. Lechuga, Bautista Ceprián, Marcos Soto, and Álvaro Luque

2019 MRS, EDXRF and GC-MS Analysis for Research on the Ritual and Funerary Areas of Cerro de los Vientos (Baeza, Jaén, Spain). Native and Eastern Mediterranean Influences. *Journal of Archaeological Science: Reports* 28: 102026.

Presents the results obtained from the physico-chemical analysis of the Orientalizing (7th century BC) archaeological materials, including several glass beads.

Sánchez de la Torrea, Marta, F. Xavier Oms, François-Xavier le Bourdonnec, Sara Aliaga, Oriol Mercadal, Artur Cebrià, and Xavier Mangado

2018 Bone or Shell? Using ED-XRF to Determine the Nature of Prehistoric Ornaments. *Journal of Archaeological Science: Reports* 21:128-136.

Presents a protocol to quickly and easily distinguish between shell and bone materials in a non-destructive manner.

Santopadre, P. and M. Verità

2000 Analyses of the Production Technologies of Italian Vitreous Materials of the Bronze Age. *Journal of Glass Studies* 42:25-40.

Analyses of beads from Frattesina and other sites reveal a complex situation: several recipes, including a soda-lime composition previously unknown in Bronze Age glass. Italy.

Sarah, G.

2004 Etude a l'aide de la spectrometrie de masse a plasma inductif avec prelevement par ablaton laser de la diffusion des perles de verre en Inde du Sud. M.A. thesis. Université François Rabelais, Tours.

Reports on the LA-ICP-MS analysis of glass beads from South India.

Sarath, Akshay, Jonathan Walz, and Laure Dussubieux

2022 Glass Beads at Unguja Ukuu in the Late 1st Millennium CE: Results of the 2018 Excavation in Zanzibar. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 287-304. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.19

Reports on the composition of a sample of glass beads, and also preliminarily examines the roles of imported beads in relation to other beads and artifacts in the cultural context of use and meaning.

Sato, Yuuki, Takashi Takeuchi, and Kazuyuki Nakamura

2018 Chemical Analysis of the Glass Beads from Fukuyama Castle Town Site in Matsumae Town, Hokkaido. *Research Reports of National Institute of Technology, Hakodate College* 52:61-65; https://doi.org/10.20706/hakodatekosen.52.0_61

Examines the age of a glass bead based on the porcelain excavated at Fukuyama Castle Town site, Japan. XRF analysis shows it is composed of alkaline lime glass. In Japanese.

Sawamura, Daichi, Chisato Kato, Mayumi Matsuzaki, Kazuya Yanase, Yoko Taniguchi, and Izumi Nakai

2015 Archaeochemical Investigation of Ancient Glass Artifact Unearthed from the Kanto Region by XRF Analysis. *Bunseki Kagaku* (Japan Analyst) 64(8):637-642.

Glass beads excavated from various archaeological sites in the Kanto region fall into three categories: potash glass, soda-lime glass, and high-alumina soda-lime glass. In Japanese with English captions and abstract.

Schibille, Nadine, James W. Lankton, and Bernard Gratuze

2022 Compositions of Early Islamic Glass along the Iranian Silk Road. *Geochemistry*, 125903; https://doi.org/10.1016/j.chemer.2022.125903.

To determine the origins and distribution of early Islamic glasses from Iran, a set of 169 glass samples (including 15 beads) from five different sites was analyzed by LA-ICP-MS. The glasses were classified into six different plant-ash glass groups, three of which are attributed to a Mesopotamian origin, while the others are presumed to represent regional Iranian production.

Schierhold, Kerstin and Gisela Woltermann

2011 Aktuelle Analysemethoden an Bernsteinperlen: Zwei Neufunde aus dem spätneolithischen Galeriegrab II von Erwitte-Schmerlecke (Kr. Soest) / Recent Methods of Analysis on Amber
Beads: Two Newly Discovered Finds from the Late Neolithic Gallery Grave II at Erwitte-Schmerlecke (Kr. Soest). *Archäologisches Korrespondenzblatt* 41(3):345-358.

Western Germany.

Schoop, Ulf-Dietrich

2013 Characterization of Late Chalcolithic Micro-Beads from Çamlıbel Tarlası, North-Central Anatolia. *Archaeometry* 55(1):14-32.

The chemical composition of the micro-beads indicates that they were made from three distinctive materials: bulk talc (i.e., synthetic enstatite precursor), apatite, and mineral-rich clay pastes.

Schrickel, Marco and Klaus Bente

2013 Bedeutung und Bedeutungsverlust roter Korallen: Archäologische und naturwissenschaftliche Studien zu eisenzeitlichen Fibeln. In *Rot – Die Archäologie bekennt Farbe. 5. Mitteldeutscher Archäologentag vom 4. bis 6. Oktober 2012*, edited by Harald Meller, et al., pp. 341-352. Tagungen des Landesmuseums für Vorgeschichte Halle (Saale) 10. https://www.academia.edu/5495112/.

Uses archaeometrical methods to examine the coral beads that decorate fibulae from Central Germany (so-called *Mitteldeutsche Korallenfibeln*) and compares them to typologically similar fibulae from southwestern Germany.

Schrickel, Marco, Klaus Bente, Christoph Berthold, Wolfgang Grill, Ulrike Teschner, Claudia Sarge, and Thomas Hoppe

2014 Vergleichende archäometrische Untersuchungen an mitteldeutschen Korallenfbeln. Fragestellungen und methodischer Überblick. In *Produktion – Distribution – Ökonomie. Siedlungs- und Wirtschaftsmuster der Latènezeit. Akten des internationalen Kolloquiums in Otzenhausen, 28.-30. Oktober 2011*, edited by S. Hornung, pp. 67-91. Universitätsforschungen zur prähistorischen Archäologie 258. https://www.academia.edu/10137974/.

Presents a comparative archaeometric study of fibulae that incorporate coral beads from Central Germany. These were especially popular during the late Hallstatt and early Latène periods.

Schrickel, Marco, Klaus Bente, Felix Fleischer, and Alexandra Franz

2013 Importation ou imitation du corail à la fin de l'âge du Fer ? Première approche par analyses du matériau. In *L'âge du Fer en Aquitaine et sur ses marges. Mobilité des hommes, diffusion des idées, circulation des biens dans l'espace européen à lâge du Fer*, edited by A. Colin and F. Verdin, pp. 753-759. Supplement Aquitania 30. https://www.academia.edu/3732592/I.

Attempts to determine the nature of the material comprising the beads of a *Mitteldeutsche Korallenfibeln*. Is it coral or an imitation?

Schulze, M., R. Lehmann, C. Vogt, and D. Vieweger

2013 Charakterisierung Mittelalterlicher Glasperlen aus dem Heiligen Land. In *Archäometrie und Denkmalpflege 2013*, edited by Andreas Hauptmann, Oliver Mecking, and Michael Prange, pp. 294-296. Metalla Sonderheft 6. https://www.academia.edu/36031369/.

A group of medieval glass beads (including two striped chevron beads) uncovered at Tall Zirā'a, Jordan, were analyzed to determine their place of manufacture, the coloring components, and manufacturing techniques.

Schüssler, U., C. Rösch, and R. Hock

2001 Beads from Ancient Sri Lanka – First Results of a Systematic Material Analysis. In *Ancient Ruhuna: Sri Lankan-German Archaeological Project in the Southern Province,* Vol. 1, edited by H.-J. Weisshaar, H. Roth, and W. Wijeyapala, pp. 227-242. Materialien zur Allgemeinen und Vergleichenden Archäologie 58. https://www.academia.edu/10245559/.

Presents EPM, XRF analyses of glass and stone beads from Tissamaharama and Akurugoda. Some distinctive red opaque glass disc beads with a very high copper content were locally made as may be some of the other glass with some glass and semi-precious stone beads probably being imported from India.

Schvoerer, Max, Richard Boyer, Francoise Bechtel, Stephan Dubernet, Jean L'Helgouac'h, and Jean Courtin

2000 Sur l'émergence de l'artisanat verrier en France méridionale au Néolithique final/Chalcolithique: une nouvelle analyse physique de la perle de Roaix (Vaucluse, France). *Bulletin de la Société préhistorique française* 97(1):73-81.

Since the mid-1970s, a bead found in the Crottes hypogeum at Roaix (Vaucluse) has been considered to be the oldest and best dated glass artifact in southern France. A re-examination of the bead reveals that the material is not glass but turquoise.

Scott, David A.

1991 *Metallography and Microstructure of Ancient and Historic Metals.* The Getty Conservation Institute, Los Angeles.

Discusses the microstructure of an 18th-century French cut-steel bead and a gold necklace bead from Colombia.

Seinfeld, Daniel M. and Munir Humayun

2020 New Insights from Elemental Analysis of Chevron Beads from Contact Period Sites in the Southeastern United States. In *Modeling Entradas: Sixteenth-Century Assemblages in North America,* edited by Clay Mathers, pp. 101-125. University Press of Florida, Gainesville. https://doi.org/10.2307/j.ctv16zk002.11.

LA-ICP-MS analysis of seven-layer chevron beads from several early-16th-century contexts in Florida revealed that the composition of the base glass is consistent with the type of glass used in Venice in the 15th through 17th centuries.

Sempowski, M.L., A.W. Nohe, R.G.V. Hancock, J.-F. Moreau, F. Kwok, S. Aufreiter, K. Karklins, J. Baart, C. Garrad, and I. Kenyon

2001 Chemical Analysis of Seventeenth Century Red Glass Trade Beads from Northeastern North America and Amsterdam. *Archaeometry* 43:503-515; https://www.academia.edu/14217765/.

Seventeenth-century opaque red (redwood) glass trade beads were made of mixed alkali (mainly soda)-lime glasses and were colored with Cu, presumably as cuprous oxide or as finely dispersed elemental Cu. During the early 17th century, beads were opacified with Sn. By the mid-17th century, cored tubular beads were being opacified with a combination of Sn and Sb, a technological change similar to that observed in white glass trade beads, while uncored redwood beads appear not to have been opacified with either Sn or Sb.

Sempowski, M., A.W. Nohe, J.-F. Moreau, I. Kenyon, K. Karklins, S. Aufreiter, and R.G.V. Hancock

2000 On the Transition from Tin-Rich to Antimony-Rich European White Soda-Glass Trade Beads in Northeastern North America. *Journal of Radioanalytical and Nuclear Chemistry* 244:559-566; https://www.academia.edu/14217767/.

In an attempt to define more closely the transition from Sn-rich to Sb-rich white beads, the researchers analyzed 198 beads from a number of archaeological sites in western New York state. This revealed that the arrival of Sb-white soda-glass trade beads began in this region during the period from approximately AD 1625-1640, and that they had completely replaced Sn-white beads by AD 1675. Specific bead chemistries link a number of the archaeological sites.

Shephard, Christopher

2015 The Materiality of Politics: Tracking the Production and Circulation of Shell Artifacts in the Algonquian Chesapeake (A.D. 900-1680). *Journal of Middle Atlantic Archaeology* 31:39-52.

Presents the results of a study aimed at assessing the viability of laser ablation inductively coupled plasma-mass spectrometry (LA-ICP-MS) for identifying shell bead production locales throughout the southern Middle Atlantic. Maryland, Virginia, and North Carolina.

Sheridan, Alison, Katherine Eremin, and Andrew Shortland

2005 Understanding Bronze Age Faience in Britain and Ireland. In *Materials Issues in Art and Archaeology VII,* edited by J. Mass, J. Merkel, A. Murray, and P. Vandiver, pp. 007.2.1-007.2.12. Materials Research Society Proceedings 852. https://www.academia.edu/39341376/.

Reports the results of archaeometric analysis of faience beads from Britain, Ireland, and adjacent parts of mainland Europe.

Shi, Meiguang, Ouli He, and Fuzheng Zhou

1986 Investigation on Some Chinese Potash Glasses Excavated from Tombs of the Han Dynasty. *Journal of the Chinese Ceramic Society* 3.

Analysis of different kinds of glass beads, glass ear pendants, and glass cups revealed that most of them belonged to the K_2O-SiO_2 glass system; China. In Chinese.

Shi, Meiguang and Fuzheng Zhou

1990 Investigation of Glass of the Han Dynasty Unearthed from Datong, Qinghai Province. *Sciences of Conservation and Archaeology* 2(2):22-26.

Reports the analysis of 12 glass beads and groups them into 3 types: lead-barium, soda-lime, and potash glass. The first is thought to be local, the soda-lime glass may be Western, and the potash glass, which is common in South China, may be local or imported. In Chinese.

1995 Some Glasses Unearthed from a Tomb of the Warring States Period. In *Proceedings of the XVIIth International Congress on Glass, Beijing, Oct. 9-14, 1995*, Vol. 6, pp. 503-506. Chinese Ceramic Society, Beijing.

The chemical composition of five glass bead samples and the corrosion products of a lead-barium glass rod were analyzed. Two compositional systems were identified: PbO-BaO-$Si0_2$ glasses and soda-lime glasses. China.

Shimada, Izumi., K.B. Anderson, Herbert Haas, and Jean H. Langenheim

1997 Amber from 1000 Year-Old Pre-Hispanic Tombs in Northern Peru. In *Materials Issues in Art and Archaeology V,* edited by P.B. Vandiver, J.R. Druzik, J.F. Merkel, and John Stewart, pp. 3-18. Cambridge University Press.

Many large amber beads were found in two Middle Sicán shaft tombs at Huaca Loro, Peru. Technical analyses and characterization (figs. 4-5) indicate the amber is probably from a source in Upper Amazonia.

Shipe, Megan, Angela Scarpa, and Lauren Johnson

2022 Origin of Blue Glass Beads Excavated at the Eyreville Site (44NH0507): A Qualitative Study. *Journal of Middle Atlantic Archaeology* 38:71-87.

Reports on the X-ray fluorescence (XRF) analysis of beads from a 17th-century context at a plantation site in Northampton County, Virginia. The authors hypothesize that the beads are of Dutch origin.

Shortland, A.

2002 An Antimony Bead from Jerablus Tahtani. *Historical Metallurgy* 36:1-5.

Presents an analysis of a rare antimony bead from 3rd millennium BC levels at Jerablus Tahtani, near Carchemish in Syria.

Shortland, A.J. and H. Schroeder

2009 Analysis of First Millennium BC Glass Vessels and Beads from the Pichvnari Necropolis, Georgia. *Archaeometry* 51(6):947-965.

Polychrome glass beads found with burials dating to the late 5th century BC were analyzed revealing both natron- and plant ash-based flux with distinct rare earth compositions, indicating multiple sites of production, some of which were probably either in the Middle East or on the Indian subcontinent.

Shortland, A.J., N. Shishlina, and A. Egorkov

2007 Origins and Production of Faience Beads in the North Caucasus and the Northern Caspian Sea Region in the Bronze Age. In *Les cultures du Caucase: leur relations avec le Proche-Orient*, edited by B. Lyonnet, pp. 269-283. CNRS Editions, Paris.

Shortland, A.J. and M.S. Tite

2006 Report on the Analysis of Cylindrical Bead SVP 29/32. In *The Chalcolithic Cemetery of Souskiou-Vathyrkakas, Cyprus,* edited by E.J. Peltenburg, pp. 95-96. Department of Antiquities of Cyprus, Nicosia.

Shugar, Aaron N. and Ariel O'Connor

2008 The Analysis of 18th Century Glass Beads from Fort Niagara: Insight into Compositional Variation and Manufacturing Techniques. *Northeast Historical Archaeology* 37(1)58-68.

An assemblage of 445 glass trade beads excavated at Old Fort Niagara, Youngstown, New York, were analyzed to determine their manufacturing technology and elemental composition. Analytical techniques included reflected light microscopy, handheld X-ray fluorescence (XRF), and scanning electron microscopy with energy dispersive X-ray spectroscopy (SEM-EDS). Elemental analysis revealed a new turquoise-blue bead composition.

Siklósi, Zsusanna, Eszter Horváth, Igor Maria Villa, Stefano Nisi, Viktória Mozgai, Bernadett Bajnóczi, Péter Csippán, Péter Hornok, and Péter Kiss

2022 The Provenance of the Raw Material and the Manufacturing Technology of Copper Artefacts from the Copper Age Hoard from Magyaregres, Hungary. *PLoSONE* 17(11):e0278116; https://www.academia.edu/97838334/.

Found in a ceramic vessel, the hoard included 681 small copper beads, 264 limestone beads, 1 *Spondylus* bead, 19 tubular spiral copper coils, and two large spectacle spiral copper pendants.

Silva, Jaciara Andrade, Olivia Alexandre de Carvalho, and Albérico Nogueira de Queiroz

2014 A cultura material associada a sepultamentos no Brasil: Arqueologia dos adornos. *Clio Arqueológica* 29(1):45-82. https://www3.ufpe.br/clioarq/images/documentos/.../artigo05.pdf

Beads and pendants (mostly from the 16th century) associated with burials at a site in Canindé de São Francisco, Sergipe state, Brazil, included those made of bone, animal teeth, shell, stone, and glass. Compositional data are provided for the glass specimens.

Silvestre, Romina, Natacha Buc, Alejandro Acosta, and Daniel Loponte

2016 Compositional Analysis on Lithic Beads. The Case of the Low Paraná Wetland, Argentina. Poster, Conference on Raw Materials Exploitation in Prehistory: Sourcing, Processing and Distribution, 10-12 March 2016, University of Algarve, Portugal. https://www.academia.edu/22357501/.

Aims to determine the primary sources of green lithic beads recovered at five Late Holocene sites in northern Argentina.

Siqin, Bilige, Qinghui Li, and Fuxi Gan

2014 Investigation of Ancient Chinese Potash Glass by Laser Ablation Inductively Coupled Plasma Atomic Emission Spectroscopy. *Spectroscopy Letters: An International Journal for Rapid Communication* 47(6):427-438.

The beads, dating mainly from the Han Dynasty to the Jin Dynasty, were recovered from several provinces of both China and Vietnam. They were divided into three glass subgroups.

Siu, Ieong, Julian Henderson, Dashu Qin, Yu Ding, and Jianfeng Cui

2021 A Study of 11th-15th Centuries AD Glass Beads from Mambrui, Kenya: An Archaeological and Chemical Approach. *Journal of Archaeological Science: Reports* 36, 102750; https://www.academia.edu/45112794/.

LA-ICP-MS results reveal that all of the beads are soda-alumina-silica glass.

Siu, Ieong, Julian Henderson, Dashu Qin, Yu Ding, Jianfeng Cui, and Hongjiao Ma

2020 New Light on Plant Ash Glass Found in Africa: Evidence for Indian Ocean Silk Road Trade Using Major, Minor, Trace Element and Lead Isotope Analysis of Glass from the 15th-16th Century AD from Malindi and Mambrui, Kenya. *PloS ONE* 5(8): e0237612; https://www.academia.edu/44830998/.

The results show that all of the glass samples are soda-lime-silica glass and belong to the high alumina-plant ash glass type.

Smirniou, Melina, T. Rehren, V. Adrymi-Sismani, E. Asderaki, and B. Gratuze

2012 Mycenaean Beads from Kazanaki, Volos: A Further Node in the LBA Glass Network. *Annales du 18e Congrès de l'Association Internationale pour l'Histoire du Verre, Thessaloniki 2009*, pp. 11-18; https://www.academia.edu/4257841/.

Presents the results of LA-HR-ICP-MS analysis of the glass beads (including relief beads) from a Late Bronze Age tholos tomb in Eastern Thessaly, Greece.

Šmit, Žiga

2014 Analysis of Historic Glass by Ion-Beam Methods. *Archeometriai Műhely* XI(3):159-167.

The analysis involves glass artifacts (including beads) dating all the way from the first centuries BC up to the early 20th century. Historical questions like the origin of raw materials and classification of glass compositional groups according to individual workshops are addressed.

Šmit, Žiga, David Jezeršek, Timotej Knific, and Janka Istenic

2009 PIXE-PIGE Analysis of Carolingian Period Glass from Slovenia. *Nuclear Instruments and Methods in Physics Research B* 267:121-124.

Glass artifacts (including beads) excavated from the Late Roman and Carolingian site at Bašelj, Slovenia, were found to be composed of traditional Roman natron-type glass.

Šmit, Žiga, Timotej Knific, David Jezeršek, and Janka Istenič

2012 Analysis of Early Medieval Glass Beads – Glass in the Transition Period. *Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms* 278:8-14; https://www.academia.edu/2437672/.

Glass beads from graves excavated in Slovenia and dated archaeologically to the 7th-10th centuries are analyzed using the combined PIXE-PIGE method.

Smith, Geoffrey M., Alexander Cherkinsky, Carla Hadden, and Aaron P. Ollivier

2016 The Age and Origin of Olivella Beads from Oregon's LSP-1 Rockshelter: The Oldest Marine Shell Beads in the Northern Great Basin. *American Antiquity* 81(3):550-561; https://www.academia.edu/27307651/.

Presents stable isotope data and accelerator mass spectrometer (AMS) radiocarbon dates for six *Callianax* (previously *Olivella*) *biplicata* beads from a rockshelter in south-central Oregon. Most of the beads were deposited during the early Holocene during a series of short-term occupations

and the shells used to manufacture them were procured along the northern California, Oregon, or Washington coasts.

Smith, Geoffrey M., Christopher S. Jazwa, Richard L. Rosencrance, and Tobin C. Bottman

2018 A Late Prehistoric Marine-Shell Bead from Oregon's Hawksy Walksy Valley. *Journal of California and Great Basin Anthropology* 38(2):288-300; https://www.academia.edu/37872368/.

Reports radiocarbon and stable isotope data for a *Callianax biplicata* bead from Oregon's Hawksy Walksy Valley, the only bead that has so far been recovered from this archaeologically important region. These data indicate that the bead was conveyed ca. 400 km inland at 480-285 cal BP from somewhere along the Oregon or northern California coasts.

Sode, Torben, Claus Feveile, and Ulrich Schnell

2010 An Investigation on Segmented, Metal-Foiled Glass Beads and Blown, Mirrored Glass Beads from Ribe, Denmark. In *Zwischen Fjorden und Steppe: Festschrift für Johan Callmer zum 65. Geburtstag*, edited by Claudia Theune, Felix Biermann, Ruth Struwe, and Gerson H. Jeute, pp. 319-328. Internationale Archäologie, Studia Honoraria 31.

A substantial number of the glass beads excavated at Ribe are imported beads, especially prevalent in the late 8th and beginning of the 9th century. This article discusses some of these beads. Lead isotope and chemical analyses of a sample indicate they were manufactured in the Near East.

Sode, Torben, Bernard Gratuze, and James W. Lankton

2017 Red and Orange High-Alumina Glass Beads in 7th and 8th Century Scandinavia: Evidence for Long Distance Trade and Local Fabrication. *Annales du 20^{e} Congrès de l'Association Internationale pour l'Histoire du Verre, Fribourg / Romont 7-11 septembre 2015*, pp. 326-333; AIHV_20eCongres_Sode.pdf.

Among nearly 200 glass samples from the Viking Age market in Ribe, Denmark, one red and two opaque orange barrel-shaped beads had a unique high-alumina composition that seems to be closely related to small, drawn, monochrome Indo-Pacific beads known to have been produced in South and Southeast Asia, but with trace elements different from any other known glass types.

Sokaras, D., A.G. Karydas, A. Oikonomou, N. Zacharias, K. Beltsios, and V. Kantarelou

2009 Combined Elemental Analysis of Ancient Glass Beads by Means of Ion-Beam, Portable XRF, and EPMA Techniques. *Analytical & Bioanalytical Chemistry* 395:2199-2209; https://www.academia.edu/36066335/.

Focuses on the analysis of an Archaic glass bead collection recently excavated from Thebes, mainland Greece, in order to suggest an optimized and synergistic analytical methodology for similar studies and to assess the reliability of the quantification procedure of analyses conducted in particular by portable XRF spectrometers.

Solís Ciriaco, Reyna Beatriz

2015 Esferas de produccion y consumo de objetos lapidarios en las estructuras aledañas del Templo Mayor de Tenochtitlan. Ph.D. dissertation. Universidad Nacional Autónoma de México, México DF. https://www.academia.edu/18993557/.

This dissertation provides a comprehensive study of the numerous lapidary objects (including beads and pendants) recovered from structures surrounding the Great Temple of Tenochtitlan in Mexico City. It identifies the raw materials and the production techniques involved, and also addresses the theoretical concepts of production organization, production spheres, tradition, and style.

2018 Esferas de producción de los objetos de piedra verde procedentes de las estructuras aledañas al Templo Mayor de Tenochtitlan. *Revista Española de Antropología Americana* 48:233-249; https://www.academia.edu/39004158/.

Archaeometric analysis of stone ornaments and other objects found in structures surrounding the Great Temple at Tenochtitlan, Mexico, is used to determine their provenience, and to see if their type and manufacture correspond to any style and/or technological tradition from Tenochtitlan or elsewhere.

Song, Sophy

2010 A Study of Glass Beads from Phum Snay Iron Age Archaeological Site and Settlement, Cambodia, Data from Excavation in 2001 and 2003. *Annali dell'Università di Ferrara, Mus. Sci. Nat.* 6:43-52.

LA-ICP-MS analysis of 75 beads revealed three groups of glass: high alumina glass (m-Na-Al); potash glass (K); and soda-lime glass beads (m-Na-Ca). This reveals that Phum Snay belongs to the Iron Age period which dates from the 4th century BC until the 3rd century AD.

Song, Yu-na and Gyu-ho Kim

2006 Analysis and Investigation of Archaeological Chemistry on the Class Beads of Dujeong-dong Site of Cheonan, Korea. *Journal of Conservation Science* 18:5-18; https://www.e-jcs.org/journal/view.php?number=234.

Beads of the Baekje period (first half of the 4th century) were found to represent several glass groups including lead-barium, soda, and potash. The beads include gold-foil examples, as well as tubular and round forms. In Korean with English abstract.

Starynowicz, M.

2005 Badania fyzikochemiczne paciorków szklanych odkrytych na grodzisku ludności kultury łużyckiej w Wicinie, woj. lubuskie [Physico-Chemical Examination of Glass Beads Discovered at a Lusatian Culture Stronghold in Wicina, Lubuskie Voivodeship]. *Archeologia Polski* L(1-2):21-52.

This site in Poland yielded ca. 900 glass beads, some with zigzag decoration. Plant ash was used as a flux in some, soda in others. The tables are captioned in Polish and English; summary in English.

Staššíková-Štukovská, Danica

2017 Natron and Plant Ash Glass in the Middle Danube Region during the Early Middle Ages. *Annales du 20e Congrès de l'Association Internationale pour l'Histoire du Verre, Fribourg / Romont 7-11 septembre 2015*, pp. 366-373.

Aims at bringing more precise information about the origin, occurrence, and cultural ties of natron and plant-ash glasses, production technologies, and shapes of beads made of these glasses in the middle Danube territory during the Early Middle Ages.

2018 K pred-laboratórnej príprave a výberu vzoriek historického skla na archeometrické analýzy [On Pre-lab Preparation and Selection of Historical Glass Samples for Archaeometric Analysis]. In *The Historical Glass: A Multidisciplinary Approach to Historical Glass III*, edited by Danica Staššíková-Štukovská, pp. 27-37. Slovak Arts Council, Bratislava.

In Slovak with English summary.

2018 Sklený korálik z interiéru Kostola sv. Margity v Kopčanoch. App. Dagmar Galusková: Analýza chemického zloženia korálika z interiéru Kostola sv. Margity č. S1/94-5_č. 1 (ďalej K1). *Historické sklo* 6:11-20; https://www.academia.edu/38639128/.

On the form and chemical composition of a glass bead recovered from the interior of the Church of St. Margity in Kopčany, western Slovakia. The bead dates to the early middle ages and is composed of potash-lime glass.

Staššíková-Štukovská, Danica and Martin Hložek

2009 Materiál korálikov z hrobu číslo 79 z Kostolian pod Tribečom [Material of Beads from Grave No. 78 at Kostoľany pod Tribečom]. *Monumentorum Tutela* 21:73-90.

Microscopic and chemical analysis of the non-metal parts of a bead necklace found with a child interred at the end of the 10th or the 11th century in west-central Slovakia identified the following materials: glass, ceramic, carnelian, and realgar. English summary.

Staššiková-Štukovská, Danica and Alfonz Plško

2015 Differences between the Findings of Segmented Beads in Skeleton Graves from the Region of Middle Danube Dated to 7th-11th Centuries. *Annales du 19e Congrès de l'Association Internationale pour l'Histoire du Verre, Piran 2012,* pp. 389-399.

Presents the results of chemical analysis of over 2000 segmented glass beads.

Stewart, Brian A., Yuchao Zhao, Peter J. Mitchell, Genevieve Dewar, James D. Gleason, and Joel D. Blum

2020 Ostrich Eggshell Bead Strontium Isotopes Reveal Persistent Macroscale Social Networking across Late Quaternary Southern Africa. *Proceedings of the National Academy of Sciences of the United States of America* 117(12):6453-6462; https://www.academia.edu/44806367/; https://doi.org/10.1073/pnas.1921037117.

Analysis of ostrich eggshell beads from highland Lesotho reveals that since the late Middle Stone Age, networks connected ecologically complementary regions over minimal distances of several hundred kilometers.

Stolyarova, Ekaterina K.

2000 Sireviye materiali i proiskhozhdenie bus epokhi bronzi zapadnoi chasti evraziiskikh stepei [Raw Materials and the Origins of Beads Dating to the 3rd Millennium B.C. from the Western Eurasian Steppe]. In *Sezonnii ekonomicheskii tsikl naselenia severo-zapadnogo prikaspia v bronzovom veke,* edited by N.I. Shishlina, pp. 91-99. Trudi Gosudarstvennogo Istoricheskogo Musea 120.

Reports on the analyses of vitreous beads from Catacomb (mostly) and North Caucasus graves. Most are faience, probably Egyptian imports. The one glass bead is possibly of double batch glass, soda-lime-silica, made with ash from the roots of *Calidium caspicum* (Russian thistle), dolomitic limestone (?), and copper oxide as a colorant. English summary (pp. 183-184).

2011 Стеклянные бусы из раскопок одиночного кургана у деревни Холмы [Glass Beads from the Kurgan near Kholmy Village]. In *The Archeology of the Moscow Region: Proceedings of Scientific Seminar* 7, edited by A.V. Engovatova, V.Yu. Koval, and I.N. Kuzina, pp. 422-428. Russian Academy of Sciences, Institute of Archeology, Moscow. https://www.academia.edu/43313922/.

Glass beads were found adorning the braids of a female burial in Moscow Oblast. They date to the 17th and first half of the 18th centuries, and are associated with the Venetian and Dutch glassmaking schools. The chemical composition of the beads is provided.

2012 Chemical Composition of Glass and Faience Beads from the Belbek IV Necropolis. *Annales du 18e Congrès de l'Association Internationale pour l'Histoire du Verre, Thessaloniki 2009*, pp. 171-174; https://www.academia.edu/29077550/.

A study of the beads of the Late Scythian Culture in the southwestern Crimea, Ukraine.

2015 Glass Beads from the Barrow Grave in the Greater Moscow Area Dated from 17th and 18th Century. *Annales du 19^{e} Congrès de l'Association Internationale pour l'Histoire du Verre, Piran 2012,* pp. 505-511; https://www.academia.edu/16117952/.

A female burial was accompanied by a hair adornment composed of glass seed beads and other components. The chemical composition of the beads is provided.

2016 Glass in Ancient and Medieval Eastern Europe as Evidence of International Contacts. *Archeologia Polski* LXI:191-212; https://www.academia.edu/43417329/.

Focuses on beads from the Bronze Age to the 17th-18th centuries AD and their chemical composition.

2018 Предметы из стекла / Glass Items. In *Мякининские курганы: Мякининский археологический комплекс в подмосковье*, edited by A.V. Engovatova, V.Yu. Koval,

E.P. Zots, E.K. Stolyarova, and T.G. Saracheva, pp. 60-75. Материалы спасательных археологических исследований 21. https://www.academia.edu/43359504/.

The inventory of glass objects recovered from the Myakininsky burial ground in the Moscow Region of Russia includes a variety of glass and stone beads. The chemical composition of some of the glass beads is provided.

2018 Seed Beads: The Dating and the Ways of Arrival in the Northern Moscow Region in Pre-Mongolian Period. In *The Historical Glass: A Multidisciplinary Approach to Historical Glass III*, edited by Danica Staššíková-Štukovská, pp. 147-154. Slovak Arts Council, Bratislava. https://www.academia.edu/43436480/.

Includes the results of compositional analysis of glass seed beads from various sites in western Russia.

Stricker, Thomas, Karlis Karklins, Mark Mangus, and Thaddeus Watts

2018 Sourcing a Unique Man-in-the-Moon Bead. *Beads: Journal of the Society of Bead Researchers* 30:60-62; https://www.academia.edu/40476024/.

Chemical analysis of a unique black bead found in Turkey that depicts the four phases of the moon reveals it most likely originated in the Fichtelgebirge region of Bavaria at some time prior to the early 19th century.

Sugihara, K., M. Satoh, Y. Hayakawa, A. Saito, and T. Sasaki

2000 Applications of Micro XRF for the Analysis of Traditional Japanese "Ainu" Glass Beads and Other Artifacts. International Centre for Diffraction Data, *Advances in X-ray Analysis* 42:161-170.

On the analysis of glass beads made by the Ainu of Japan in the 1800s.

Swann, C.P., P.E. McGovern, and S.J. Fleming

1989 Colorants in Glasses from Ancient Syro-Palestine: Specialized Studies Using PIXE Spectrometry. *Nuclear Instruments and Methods in Physics Research* B40/41:615-619.

Presents the results of PIXE analysis of multi-colored pendants and beads from the Syro-Palestinian Bronze Age site of Beth Shan, Israel.

Takahashi, Misuzushi, Kenichiro Koshida, Takashi Takeuchi, and Kazuyuki Nakamura

2018 Component Analysis of Glass Beads from Minamikawa 2 Site Setana Town, Hokkaido. *Research Reports of National Institute of Technology, Hakodate College* 52:66-74; https://doi.org/10.20706/hakodatekosen.52.0_66

Examines beadmaking (winding) techniques and the chemical composition of glass beads excavated from an archaeological site of the Ainu Cultural Period from the 16th-17th centuries in Japan. The glass is of the potash-lead-silica type (K_2O-PbO-SiO_2). In Japanese.

Tamura, Tomomi

2010 Scientific Research of Soda-Lime Glass Beads found in the Yayoi Period. Nara National Research Institute for Cultural Properties, *Annual Bulletin* 2010:28-29.

Iron Age, Japan.

2011 Archaeological Research on the Glass Beads among the Chindangu, Buried Ritual Objects, for the Kondō at Tōdai-ji Temple. *Bulletin of the Nara National Museum "Rokuon Zasshu"* 13:124-94(1-41).

Reports on the chemical composition of the beads from the temple in Japan. Numerous macro photographs. Text is in Japanese. *See also* Katsuhiko (2011).

2013 Archaeometric Investigation of Glass Beads Excavated at the Matsugasako Yadani Site. Nara National Research Institute for Cultural Properties, *Annual Bulletin* 2014:70-71.

Japan.

2019 Chemical Analysis of Ancient Glass Beads in and around Mainland Southeast Asia. In *The Ancient East-West Corridor of Mainland Southeast Asia,* edited by Mamoru Shibayama, pp. 233-289. Geoinfomatics International. https://www.researchgate.net/publication/337338322.

Ancient glass beads from sites in Myanmar, Cambodia, Vietnam, and India are examined in terms of production techniques and chemical composition. Further, they are compared with clearly dated artifacts that have been excavated in Japan, whose chemical compositions have been relatively well determined.

Tamura, Tomomi, Tomoya Aono, and Kazuyuki Nakamura

2018 Compositional Investigation of Glass Beads Excavated from Usu-Oyakotsu Site in Hokkaido. *Research Reports of National Institute of Technology, Hakodate College* 52:85-92; https://doi.org/10.20706/hakodatekosen.52.0_85

Re-examination of glass beads from a site in Japan clarified that they are composed of potash-lime glass and potash-lead glass. In Japanese.

Tamura, Tomomi and Yasuharu Hoshino

2014 Scientific Study of a Multi-Colored Glass Bead from the Oido Tunnel Tombs in Miyagi. Nara National Research Institute for Cultural Properties, *Annual Bulletin* 2014:38-39.

Japan.

Tamura, Tomomi, Daisuke Nakamura, Jamsranjav Bayarsaikhan, Jean-Luc Houle, and Tumurbaatar Tuvshinjargal

2021 Scientific Analysis on the Glass Beads from the Xiongnu Burial of Zamiin Utug. *Nomadic Heritage Studies* XXII-II:89-102; https://www.academia.edu/38479920/.

Examines the beadmaking techniques and chemical composition of glass beads unearthed from a site on the Mongolian plateau that was utilized during the Han Dynasty (206 BC-AD 220).

Tamura, Tomomi, Daisuke Nakamura, and Dac Chien Truong

2021 Chemical Analysis of Ancient Glass in Vietnam: A Comparative Study of Glass Beads Found in Vietnam and Japan. *Nabunken Ronso* 2:125-150; https://www.researchgate.net/publication/359055207.

The chemical compositions of glass beads belonging to the Dong Son and Sa Huynh cultures of Vietnam are compared to those of Yayoi-period beads from Japan.

Tamura, Tomomi and Katsuhiko Oga

2014 Distribution of Lead-Barium Glasses in Ancient Japan. *Crossroads* 9:63-82; https://www.researchgate.net/publication/303486321.

Categorizes lead-barium beads and pendants from tomb of the Yayoi and Kofun periods based on form, manufacturing methods, and chemical composition, and discuss each production area and distribution route.

2016 Archaeometrical Investigation of Natron Glass Excavated in Japan. *Microchemical Journal* 126:7-17; https://doi.org/10.1016/j.microc.2015.11.029.

Examines the chemical compositions, colorants, and beadmaking techniques of natron glass beads. The glass is grouped into seven main types, as well as other minor types.

Taniguchi, Yoko, Yoshimitsu Hirao, Yoshiko Shimadzu, and Akira Tsuneki

2002 The First Fake? Imitation Turquoise Beads Recovered from a Syrian Neolithic Site, Tell El-Kerkh. *Studies in Conservation* 47(3):175-183.

Three turquoise-blue beads were analyzed by various means. The results indicate that the beads were an imitation of natural turquoise. They have an apatite core with the turquoise color obtained probably by the heating of manganese or iron compounds. The structure suggests mammal tooth or tusk.

Tapia, Alicia H. and Virginia Pineau

2011 Diversidad de las cuentas vítreas. Los hallazgos de la misión de Santiago del Baradero (siglo XVII) [Vitreous Beads Diversity. Mission of Santiago del Baradero Findings (XVII Century)]. *Arqueología* 17:1-18.

Presents the results of morphologic, functional, micro-structural, and chemical analysis of glass beads excavated at the “Cementerio Indígena” site which is connected with the Franciscan mission of Santiago del Baradero founded in 1615 in Buenos Aires, Argentina. English abstract.

2011 Tipología, manufactura y procedencia de las cuentas de Santiago del Baradero. In *Libro de resúmenes del I° Congreso Internacional de Arqueologíade la Cuenca del Plata*, pp. 111-112. Buenos Aires, Argentina.

Describes the 29 types of European glass beads found with burials at the Cementerio Indígena, Baradero, Argentina. They are attributed to the period from the end of 16th century to the first half of the 17th century. The results of MEB-EDX analysis of 14 of the bead types are also presented.

Tate, Jim, Katherine Eremin, Lore G. Troalen, Maria Filomena Guerra, Elizabeth Goring, and Bill Manley

2019 The 17th Dynasty Gold Necklace from Qurneh, Egypt. *ArchéoSciences* 33:121-128; https://www.academia.edu/1118080/.

Describes the necklace and also provides information concerning its production techniques and the composition of the metal.

Templin, Robert B., III

2017 Black Glass on the Georgia Coast: The Utility of Black Glass Trade Beads in Refining Site Chronology and Detecting Color Preference at Seventeenth Century Mission Santa Catalina de Guale. M.A. thesis. Department of Anthropology, University of Alabama, Tuscaloosa.

Identifies diachronic patterns in the recipes that guided the manufacture of drawn black beads during the 17th century. The concentrations of temporally diagnostic opacifiers (i.e., tin and antimony found within beads assemblages from individual contexts are then used to refine the existing site chronology and contribute to ongoing studies of the occupation and use of the mission.

Teodor, E.S., E.D. Teodor, M. Virgolici, M.M. Manea, G. Truică, and S.C. Liţescu

2010 Non-Destructive Analysis of Amber Artefacts from the Prehistoric Cioclovina Hoard (Romania). *Journal of Archaeological Science* 37(10):2386-2396.

Amber beads from the transitional period between the Late Bronze Age and the Iron Age were analyzed to determine the source of the amber. The results strongly suggest that a large part of the amber has a Romanian origin and, thus, no connection with the Amber Route.

Tereschenko, E.Y., I.N. Kuzina, A.V. Mandrykina, O.A. Kondratev, E.S. Kulikova, R.D. Svetogorov, P.V. Gureva, E.S. Kovalenko, M.M. Murashev, E.S. Vaschenkova, A.M. Ismagulov, V.M. Retivov, and E.B. Yatsishina

2022 On the Mystery of One Bead. *Nanobiotechnology Reports* 17:594-609; https://doi.org/10.1134/S2635167622050172.

Analysis of a 14th-century biconical glass bead excavated at the Rostislavl settlement in Moscow oblast, Russia, revealed that it differs significantly from all beads traditionally found in this region: the bead was made by combining separate layers of the base and decorating material from glasses of two classes, lead silicate and potash lead.

Thanik Lertcharnrit and A.K. Carter

2010 Recent Research on Iron Age Glass and Stone Beads from Promtin Tai, Central Thailand. *Muang Boran Journal* 36(4):53-68.

In Thai.

Then-Obłuska, Joanna

2021 Indian Glass Beads in Northeast Africa between the First and Sixth Centuries CE. In *Ancient Glass of South Asia: Archaeology, Ethnography and Global Connections*, edited by Alok Kumar Kanungo and Laure Dussubieux, pp. 533-557. Springer, Singapore.

Presents the chronological and spatial distribution of Indian glass beads in the territories of ancient Egypt, Nubia, and Aksum during a time of intensive Indian Ocean trade. Chemical compositional analysis of selected samples confirms the provenience of monochrome and bichrome drawn and rounded beads to be of South Indian/Sri Lankan origin.

Then-Obłuska, Joanna and Laure Dussubieux

2016 Glass Bead Trade in the Early Roman and Mamluk Quseir Ports – A View from the Oriental Institute Museum Assemblage. *Archaeological Research in Asia* 6:81-103; https://www.academia.edu/25089416/.

Reports on an interdisciplinary study of 35 beads found mostly at Quseir port sites in Egypt; Roman Myos Hormos (1st-3rd c. AD) and Late Ayyubid-Mamluk Quseir el-Qadim (13th-14th c. AD) periods.

2021 Beads for the Nomads of Late Antiquity. Chemical Characterisation of Glass from the Blemmyan Tumuli at Kalabsha, Nubia, Mid Fourth Century AD. *Archaeometry* 63(6):1255-1271; https://www.academia.edu/49053628/.

Analysis of 34 glass beads using LA-ICP-MS has identified four glass groups. The results provide scientific evidence for the northernmost presence of South Indian/Sri Lankan glass beads in the Nile Valley and hint at the Blemmyan participation in broader regional exchange networks in Northeast Africa during a time of intensive overseas trade.

2021 Teardrops at the Lake: Chemistry of New Kingdom to Makuria Glass Beads and Pendants between the First and Second Nile Cataracts. *African Archaeological Review* 40(2):295-315; https://doi.org/10.1007/s10437-021-09467-1.

Discusses the composition and provenience of two types of plant-ash soda-lime (v-Na-Ca) glass, two types of mineral soda-lime glass (m-Na-Ca), and two types of mineral-soda-high alumina (m-Na-Al) glass based on the LA-ICP-MS analysis of beads and pendants recovered from Qustul and Serra East contexts in northern Sudan.

2022 Beads from a Mediaeval Pilgrim Centre: Chemical Composition and Provenance of Glass from Banganarti, Nubia, Sudan. *Archaeometry*; https://doi.org/10.1111/arcm.12818.

Compositional analyses using LA-ICP-MS have identified glass belonging to a number of broad compositional groups, providing new evidence regarding the provenience and chronology of glass beads available in medieval Northeast Africa.

2023 Overseas Imports on the Blue Nile – Chemical Compositional Analysis of Glass Beads from Soba, Nubia. *Archaeometry*; https://www.academia.edu/99027377/.

LA-ICP-MS analysis of glass beads from the most prosperous capital of medieval Nubia has identified a number of broad glass compositional groups, leaving no doubt about Alwa's (Alodia's) intense transcultural connections.

Then-Obłuskaa, Joanna, Laure Dussubieux, J. Mark Kenoyer, and Randall Law

2021 Beads and Pendants. In *Banganarti Studies I (Nubia VII)*, edited by Bogdan Żurawski, pp. 77-108. Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences, Warsaw. https://www.academia.edu/85049494/.

Reports on a large collection of beads and pendants made of resin, ostrich eggshell, stone, faience, and glass recovered from a site in northern Sudan. Most of them were found in a pottery vessel dated to the 8th-10th centuries; others are attributable to the 6th/7th-14th centuries. Combined macroscopic and chemical compositional analyses reveal the sources of the raw materials.

Then-Obłuska, Joanna, H.A. Gilg, U. Schüssler, and B. Wagner

2020 Western Connections of Northeast Africa: The Garnet Evidence from Late Antique Nubia, Sudan. *Archaeometry* 63(2):227-246; https://www.academia.edu/44104553/.

LA-ICP-MS analysis of garnet beads from an elite tomb at the 4th-century cemetery of Hagar el Beida suggest possible sources in Portugal and Nigeria, and a connection to similar garnets from Merovingian contexts.

Then-Obłuska, Joanna and Barbara Wagner

2019 Glass Beads and Pendants from Meroitic and Nobadian Lower Nubia, Sudan: Chemical Compositional Analysis Using Laser Ablation Inductively Coupled Plasma Mass Spectrometry. *Archaeometry* 61(4):856-873; https://doi.org/10.1111/arcm.12465.

Presents a detailed elemental analysis of 64 glass beads and pendants dated to the Meroitic period (1st-3rd centuries AD) and the Nobadian period (4th-6th centuries) from burial sites in the Lower Nubian Nile Valley region.

Then-Obłuska, Joanna with Barbara Wagner

2019 *Glass Bead Trade in Northeast Africa: The Evidence from Meroitic and Post-Meroitic Nubia.* PAM Monograph Series 10.

Strings of colorful glass beads were a popular commodity traded throughout ancient Nubia during the first half of the 1st millennium AD. Combining macroscopic examination with laboratory analyses (LA-ICP-MS), the author breaks new ground in Nubian studies, establishing diagnostic markers for a study of trading markets and broader economic trends in Meroitic and post-Meroitic Nubia.

Then-Obłuska, Joanna, Barbara Wagner, and Luiza Kępa-Linowska

2019 Dare to Gaze upon Her Face: An Interdisciplinary Analysis of Mosaic Face Beads from Meroë. *Journal of Glass Studies* 61:39-48.

Presents an in-depth examination of mosaic glass beads recovered from a child's grave in the royal cemetery at Meroë (Bagrawiyah, Sudan). Their chemical composition reveals that the glass used in their manufacture was produced in Egypt.

Theune, C., P. Hoffmann, S. Bichlmeier, M. Heck, and J. Callmer

1998 Bestimmung der Glasmatrix merowingerzeitlicher Glasperlen. In *Proceedings der Jahrestagung Archäometrie und Denkmalpflege, Würzburg 23.-25.9.1998,* pp. 108-110.

On the determination of the glass matrix of Merovingian glass beads.

Theunisson, R., P. Grave, and G. Bailey

2000 Doubts on Diffusion: Challenging the Assumed Indian Origin of Iron Age Agate and Carnelian Beads in Southeast Asia. *World Archaeology* 32(1):84-105.

Discusses the use of non-destructive geochemical techniques to source carnelian and agate beads from Southeast Asia and raw material from India and Thailand. Preliminary results suggest that some early beads excavated in Thailand were made from local materials.

Thondhlana, T.P. and M. Martinón-Torres

2009 Small Size, High Value: Composition and Manufacture of Second Millennium AD Copper-Based Beads from Northern Zimbabwe. *Journal of African Archaeology* 7(1):79-97.

This investigation introduces a new dimension to the previous typological analyses of the metal bead assemblages from Zimbabwean archaeological sites. It presents the microstructural and chemical characterization of 50 copper-based beads, most of them from Later Farming Community period sites in northern Zimbabwe (AD 1000-1900). The analytical study employed optical microscopy, ED-XRF, and SEM-EDS.

Tian, Chenxin, Yihang Zhou, Kai Wang, Jian Sun, Yong Cui, and Dongbo Hu

2021 Characterization of Glass Beads from Nanhai I Shipwreck and New Evidence of Lead Tin Yellow Type II in China. *Heritage Science* 9, art. 61; https://doi.org/10.1186/s40494-021-00540-1.

Analysis of coil beads dating to the Southern Song dynasty reveals they are all of K_2O-PbO-SiO_2 and PbO-SiO_2 glass systems which confirms their Chinese origin.

Timby, Jane R.

1996 *The Anglo-Saxon Cemetery at Empingham II, Rutland.* Oxbow Monograph 70.

Reports on the beads and pendants recovered from a site in central Great Britain, including their chemical composition. Materials include glass, amber, coral, rock crystal, and metal.

Tite, M.S.

1998 Report on SEM Examination of Faience Bead, KM 2056. In *Lemba Archaeological Project Vol. II.1A: Excavations at Kissonerga-Mosphilia 1979-1992,* edited by E.J. Peltenburg, pp. 194-195. Studies in Mediterranean Archaeology 70.

Tite, M.S., Y. Maniatis, D. Kavoussanaki, M. Panagiotaki, A.J. Shortland, and S.F. Kirk

2009 Colour in Minoan Faience. *Journal of Archaeological Science* 36(2):370-378.

The microstructures and chemical compositions of some 15 faience objects from Crete spanning the period from Middle Minoan IIIA through to Late Minoan IA were determined using analytical scanning electron microscopy. These data are useful for inferring the original color of Minoan faience, most of which has suffered severe weathering during burial.

Tite, M.S., P. Manti, and A.J. Shortland

2007 A Technological Study of Ancient Faience from Egypt. *Journal of Archaeological Science* 34:1568-1583; https://www.academia.edu/1833452/.

Presents the chemical compositions and microstructures of faience objects (beads included) from Egypt spanning the period from the Middle Kingdom through to the 22nd dynasty as determined using analytical scanning electron microscopy.

Toffolo, Michael B., Eugenia Klein, Rivka Elbaum, Adam J. Aja, Daniel M. Master, and Elisabetta Boarettoa

2013 An Early Iron Age Assemblage of Faience Beads from Ashkelon, Israel: Chemical Composition and Manufacturing Process. *Journal of Archaeological Science* 40(10): 3626-3635.

The microstructure and chemical composition of 8 faience beads from an early Iron Age (12th century BC) assemblage found in the ancient port city of Ashkelon are determined by means of FTRI spectrometry, pXRF, microRaman, and SEM-EDS analysis.

Tomková, K., V. Hulínský, and J. Košta

2011 Olivovité perly a jejich chemické složení. In *Historické sklo. 5. Sborník pro dějiny skla*, edited by E. Černá, pp. 67-74. Most.

On glass olive beads and their chemical composition.

Tomková, Kateřina, Šárka Jonášová, and Zuzana Zlámalová Cílová

2017 Glass in Fashion and Trade in Bohemia in the 9th-11th Century (Archaeology and Archaeometry). *Annales du 20^{e} Congrès de l'Association Internationale pour l'Histoire du Verre, Fribourg / Romont 7-11 septembre 2015*, pp. 374-378.

Concentrates on the archaeological and chemical variability of glass artifacts, especially jewelry, their provenance, and the question of continuity in the development of glass jewelry between the 10th and 11th centuries.

Tomková, Kateřina, Šárka Křížová, and Tomáš Vaculovič

2020 Korálky ze Zelenče ve světle analýz chemického složení skel. In *Raně středověké pohřebiště v Zelenči,* edited by Michal Lutovský and Jaroslav Špaček, pp. 87-99. Archeologie ve středních Čechách – Supplementum 1. https://www.academia.edu/45581812/.

Reports on the composition of glass beads from an early medieval village cemetery (10th century) in Zeleneč, Bohemia.

Tomková, Katerina and Natalie Venclová

2014 Glasschmuck in Böhmen von der Bronzezeit bis ins Frühmittelalter: Archäologie und Archäometrie. In *Glasarchäologie in Europa: Regionen – Produkte – Analysen. Beiträge zum 5. Internationalen Symposium zur Erforschung mittelalterlicher und frühneuzeitlicher Glashütten Europas, Seiffen/Erzgebirge 2012,* edited by Eva Černá and Peter Steppuhn, pp. 221-237. Ústav Archeologické Památkové Péče Severozápadních Čech, Most. https://www.academia.edu/8203988/.

Presents an overview of the different bead types utilized in Bohemia and Moravia from the Bronze Age to the early Middle Ages, including production technology and chemical composition.

Tomková, Katarina, Natalie Venclová, Šárka Křížová, Nadine Schibille, Veronika Faltusová, Tomáš Vaculovič, and David Daněček

2023 Early Medieval Glass Beads: Witness to Changes in Central Europe – the Case of Hostivice (Czech Republic). *Archaeological and Anthropological Sciences* 15, 60; https://link.springer.com/article/10.1007/s12520-023-01754-z.

Chemical analyses confirm that beads from central Europe reflect the principal transition from natron to plant-ash glass during the 8th-9th centuries. They also reveal that beads made from natron glass were still distributed in the 9th-10th centuries when new types of beads were made from this glass.

Tomomi, Tamura, Nakamura Daisuke, Bayarsaikhan Jamsranjav, Houle Jean-luc, and Tuvshinjargal Tumurbaatar

2021 Scientific Analysis on the Glass Beads from the Xiongnu Burial of Zamiin Utug. *Nomadic Heritage Studies* XXII-II(1-22):89-102; https://www.academia.edu/62292250/.

Examines the beadmaking technique and chemical composition of glass beads found with burials in northwestern Mongolia.

Tournié, Aurélie, Linda C. Prinsloo, and Philippe Colomban

2010 Raman Spectra Database of the Glass Beads Excavated on Mapungubwe Hill and K2, Two Archaeological Sites in South Africa. University of Pretoria. https://www.academia.edu/15107217/.

Analysis revealed at least seven different chromophores or pigments, many of which were only manufactured after the 13th century which confirms the presence of modern beads in the archaeological record. This calls for further research to find a way to reconcile the carbon dating of the hill, which currently gives the last occupation date on the hill as AD 1280, with the physical evidence of the modern beads.

2012 Raman Classification of the Glass Beads Excavated on Mapungubwe Hill and K2, Two Archaeological Sites in South Africa. *Journal of Raman Spectroscopy* 43(4):532-542.

Analysis revealed at least seven different chromophores or pigments (lazurite, lead tin yellow type II, Ca/Pb arsenate, chromate, calcium antimonate, Fe-S "amber," and a spinel). Many of the pigments were only manufactured after the 13th century which confirms the presence of modern beads in contradiction to radiocarbon dating which indicates occupation of the hill ended in AD 1280.

Towle, Andrew C.

2002 A Scientific and Archaeological Investigation of Prehistoric Glasses from Italy. Ph.D. thesis. University of Nottingham. http://eprints.nottingham.ac.uk/11741/.

This study examines a wide selection of glass artifacts (including beads) recovered from archaeological contexts in northern and central Italy dating to ca. 1200-200 BC. The chemical analysis reveals a complex picture of glass production which defies the expected pattern, and there is evidence for new compositional types which may yet prove to be diagnostic of highly localized production.

Towle, Andrew C. and Julian Henderson

2007 The Glass Bead Game: Archaeometric Evidence for the Existence of an Etruscan Glass Industry. *Etruscan Studies* 10(1):47-66.

Chemical analyses of several objects including Etruscan vessels and glass beads from British collections suggest that a diagnostic Etruscan glass technology was used to make beads rather than the ornate vessels. Italy.

Towle, Andrew C., Julian Henderson, Paolo Bellintani, and Giovanna Gambacurta

2001 Frattesina and Adria: Report of Scientific Analyses of Early Glass from the Veneto. *Padusa* 37:7-68; https://www.academia.edu/37566898/.

Discusses the data from the chemical analysis of a group of glasses (beads included) from Final Bronze Age and Iron Age sites in the Po Valley of Italy.

Trifonov, V.A., N.I. Shishlina, A.Yu. Loboda, N.N. Kolobylina, E.Yu. Tereschenko, and E.B. Yatsishina

2019 The Production of Thin Walled Jointless Gold Beads from the Maykop Culture Megalithic Tomb of the Early Bronze Age at Tsarskaya in the North Caucasus: Results of Analytical and Experimental Research. *Archaeometry* 61(1):117-130.

One of the tasks of the study was to determine the chemical composition of the beads.

Trivedi, Mudit and Laure Dussubieux

2022 Inland from the Sea: Rethinking the Value of Mineral Soda Alumina Drawn Glass Beads from Medieval North India. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather

Walder, pp. 221-244. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.16.

Analysis of 12 drawn beads recovered from Indor, a 2nd millennium CE site, has revealed hitherto unprecedented variation in drawn beads by compositional group.

Troalen, Lore G., Maria Filomena Guerra, Jim Tate, and Bill Manley

2009 Technological Study of Gold Jewellery Pieces Dating from the Middle Kingdom to the New Kingdom in Egypt. *ArchéoSciences* 33:111-119; https://www.academia.edu/35998229/.

This preliminary study provides information about the evolution of alloy composition and the use of alluvial gold in such items as beads and pendants.

Trombetta, Lindsey, Laure Dussubieux, Agazi Negash, Daniel Dalmas, Metasebia Endalamaw, Mulugeta Feseha, Lawrence Todd, and John Kappelman

2022 Beads from the Lowlands of Northwestern Ethiopia. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 247-264. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.17.

The majority of the beads from site GQ165, which dates to ca. 1337 cal CE, belong to the v-Na-Al glass type that is found at different sites on the east coast of Africa dating from the 14th to the 16th century. While their compositions are similar, their typologies are distinct.

Truffa Giachet, Miriam

2016 Étude préliminaire des perles en verre d'Afrique de l'Ouest. Poster presentation at the 23rd biennial meeting of the Society of Africanist Archaeologists, Toulouse, France.

Presents preliminary results of the analysis of glass beads recovered from seven sites in West Africa dating to the 7th-20th centuries.

2019 Étude archéométrique des perles en verre d'Afrique de l'Ouest : vers une meilleure compréhension des dynamiques techniques et commerciales à l'époque des empires précoloniaux. D.S. thesis. Département de Génétique & Évolution, Université de Genève.

Reports the findings of an archaeometric study of 954 glass beads recovered from 10 archaeological sites in Mali, Senegal, and Ghana, from contexts dated between the 7th-5th centuries BC and the 18th-20th centuries AD.

Truffa Giachet, Miriam, Bernard Gratuze, Anne Mayor, and Eric Huysecom

2020 Compositional and Provenance Study of Glass Beads from Archaeological Sites in Mali and Senegal at the Time of the First Sahelian States. *PLoS ONE* 15(12): e0242027; https://doi.org/10.1371/journal.pone.0242027.

Reports the results of LA-ICP-MS analysis of 16 glass beads found at three rural sites: the funerary site of Dourou-Boro and settlement sites of Sadia, in central Mali, as well as the

settlement site of Djoutoubaya, in eastern Senegal, in contexts dated between the 7th-9th and the 11th-13th centuries CE. Results show that the raw materials used to manufacture the majority of the glass most probably originated in Egypt, the Levantine coast, and the Middle East.

Truffa Giachet, Miriam, Bernard Gratuze, Sylvain Ozainne, Anne Mayor, and Eric Huysecom

2019 A Phoenician Glass Eye Bead from 7th-5th c. cal BCE Nin-Bèrè 3, Mali: Compositional Characterisation by LA-ICP-MS. *Journal of Archaeological Science: Reports* 24:748-758; https://www.academia.edu/84082976/.

The bead is composed of soda-lime-silica glass fluxed with mineral soda, and colored and opacified with cobalt, copper, and antimony. This exceptional find this far south in Africa expands greatly the area of distribution of this bead form and suggests a very early indirect contact between sub-Saharan Africa and the Mediterranean Basin.

Tzankova, Nikoleta

2017 Анализ на мъниста от стр. 73A [Analysis of Beads from Feature 73A]. In *Sarnevo. Pits from the Late Neolithic, the Early and Late Iron Age, and the Roman Period. Volume 1: The Late Neolithic Pit Field*, edited by K. Bacvarov, M. Tonkova, and G. Katsarov, pp. 565-570. National Institute of Archaeology with Museum - BAS, Sofia, Bulgaria.https://www.academia.edu/35578464/.

Reports on the mineral composition and gemological properties of four beads made of copper ore (malachite and azurite) and serpentinite (ultrabasite) from a site in southeastern Bulgaria. In Bulgarian with English abstract.

Tzankova, Nikoleta and Philip Mihaylov

2019 Chemical Characterization of Glass Beads from the Necropolis of Dren-Delyan (6th-4th Century BC), Southwest Bulgaria. *Geologica Balcanica* 48(2):31-50; https://www.academia.edu/74359469/.

The analyzed beads are all classified as a low-magnesium type (LMG) except for one which is a high-magnesium glass (HMG). Also discusses the colorants and opacifiers.

Uboldi, Marina, Marta Rapi, and Ivana Angelini

2014 Perle golasecchiane in materiale vetroso dai dintorni di Como. In *XVI Giornate Nazionali di Studio sul Vetro: Il vetro in età protostorica in Italia,* edited by Silvia Ciappi, Annamaria Larese, Marina Ubold, pp. 39-54. Comitato Nazionale Italiano, Association Internationale pour l'Histoire du Verre, Venice.

Expounds upon protohistoric (9th-4th centuries BC) beads of faience, glassy faience, and glass from the Como area of northern Italy. Typological, technological, and archaeometric aspects are examined.

Uesugi, Akinori, Izumi Nakai, Manmohan Kumar, Kyoko Yamahana, Yoshinari Abe, Junko Shirataki, Kanae Toyama, and Vivek Dangi

2017 A Study on Faience Objects in the Ghaggar Plains during the Urban and Post-Urban Indus Periods. *Heritage: Journal of Multidisciplinary Studies in Archaeology* 5:140-164.

Examines the morphological and compositional variations of faience objects (including beads) collected from several Indus sites in the Ghaggar Valley of India.

Valdes Herrera, Alejandro

2018 Elementos marinos y piedras verde-azules como ajuar funerario en la Tumba II de Tingambato, Michoacán. M.A. thesis. Department of Archaeology, Escuela Nacional de Antropología e Historia, Mexico City. https://www.academia.edu/37601923/.

Reports on the shell, stone, and bone beads recovered from a precolumbian site in Mexico, including the chemical composition of the stone beads and their production techniques.

Valiulina, Svetlana

2018 Chemické zloženie sklenených korálikov z Bolgaru (od obdobia vikingov po Zlatú Hordu) [The Chemical Composition of Bolgar Glass Beads (from Viking Age to the Golden Horde]. In *The Historical Glass: A Multidisciplinary Approach to Historical Glass III*, edited by Danica Staššíková-Štukovská, pp. 165-185, 392-395. Slovak Arts Council, Bratislava.

Aims to determine the origin of glass beads found at sites in Bolgar based on their chemical composition, while taking into regard their morphology and technology in each historical era of the Bolgar state. In Slovak with English summary.

Valiulina, S.I., P.V. Mandryka, P.O. Senotrusova, and A.A. Trifonov

2017 Бусы населения Нижнего Приангарья в развитом средневековье (по материалам могильника Проспихинская Шивера-IV) [Beads of the Population of the Lower Angara Region in the High Middle Ages (by Materials from Prospikhinskaya Shivera-IV Burial Ground)]. In *"Summa technologiarum": by homilies of Theophilus Presbyter,* edited by Roman A. Rabinovich, pp. 311-324. Stratum plus 5.

Presents a comprehensive analysis of the beads of glass, earthenware, and stone recovered from a burial ground of the 11th-14th centuries in Central Siberia. Includes chemical analysis. In Russian.

Vandiver, Pamela, Mark Fenn, and T.A. Holland

1992 A Third Millennium B.C. Glazed Quartz Bead from Tell es-Sweyhat, Syria. *MRS Proceedings* 267.

Microprobe analyses and replicate melts revealed that the composition was 60% SiO2, 20% CuO and 20% flux, probably as soda, potassia, or a combination. This is unusual for ancient glasses and glazes because of its high copper oxide content, which may indicate a link with copper or malachite technology.

Vandiver, Pamela and K. Aslıhan Yener

2006 Appendix 1. Scientific Analysis of Two Akkadian Glass Beads. In *Nippur V: The Early Dynastic to Akkadian Transition, The Area WF Sounding at Nippur*, edited by Augusta McMahon, pp. 149-159. The University of Chicago Oriental Institute Publications 129.

The beads from Nippur, Iraq, are very important early examples (3rd millennium BC) of glass technology. The manufacturing process, compositional analysis, color chemistry, and microstructure are discussed.

Vanhaeren, M., F. d'Errico, I. Billy, and F. Grousset

2004 Tracing the Source of Upper Paleolithic Shell Beads by Strontium Isotope Dating. *Journal of Archaeological Science* 31:1481-1488.

Applies 87Sr/86Sr isotope dating to identify the origin of Upper Palaeolithic *Dentalium*-shell beads found with the La Madeleine child burial, Dordogne, France, dated to 10,190+/-100 BP.

Vanhaeren, M., F. d'Errico, C. Stringer, S.L. James, J.A. Todd, and H.K. Mienis

2006 Middle Palaeolithic Shell Beads in Israel and Algeria. *Science* 312:1784-1788.

Perforated marine gastropod shells at the western Asian site of Skhul and the North African site of Oued Djebbana indicate the early use of beads by modern humans in these regions. Elemental and chemical analyses of sediment matrix adhering to one shell bead from Skhul indicate it dates to 100,000 to 135,000 years ago, about 25,000 years earlier than previous evidence for personal decoration by modern humans in South Africa.

Van Ham-Meert, Alicia, Sarah Dillis, Annelore Blomme, Nicholas Cahill, Philippe Claeys, Jan Elsen, Katherine Eremin, Axel Gerdes, Christian Steuwe, Maarten Roeffaers, Andrew Shortland, and Patrick Degryse

2019 A Unique Recipe for Glass Beads at Iron Age Sardis. *Journal of Archaeological Science* 108; https://www.academia.edu/69628483/.

Presents a unique snapshot of developments in glass technology in Anatolia during the Middle Iron Age, when glass was still a relatively rare commodity, by focussing on black glass beads decorated with yellow trails, beads that are very rare during the 8th-7th centuries BCE. Turkey.

Vanna, L.

2007 Chemical Characterization of Glass Beads from the Iron Age Site of Snay, Northwestern Cambodia. In *Regional Diversity in Archaeology: Southeast Asia Region*, edited by Masako Marui, pp. 347-359. Yu-zankaku, Japan.

Van Strydonck, Mark, Bernard Gratuze, JoëlleRolland, and Guy De Mulder

2018 An Archaeometric Study of Some Pre-Roman Glass Beads from Son Mas (Mallorca, Spain). *Journal of Archaeological Science: Reports* 17:491-499; https://www.academia.edu/83599646/.

Dating from the 3rd millennium until the early Roman period, the beads fall into three main groups based on their chemical composition.

Varberg, Jeanette

2021 Mesopotamian and Egyptian Glass in Danish Bronze Age Graves. In *Vom Künstlichen Stein zum durchsichtigen Massenprodukt: Innovationen in der Glastechnik und ihre sozialen Folgen zwischen Bronzezeit und Antike*, edited by Florian Klimscha, Hans-Jörg Karlsen, Svend Hansen, and Jürgen Renn, pp. 105-117. Berlin Studies of the Ancient World 67. https://refubium.fu-berlin.de/handle/fub188/29236.

Glass beads from Danish and North German Bronze Age graves show surprising chemical parallels to glass from Egypt and Mesopotamia. It is argued that the Danish glass was part of the Mediterranean trade systems and that the Bronze Age glass network was able to bridge more than 5000 kilometers.

Varberg, Jeanette, Bernard Gratuze, and Flemming Kaul

2015 Between Egypt, Mesopotamia and Scandinavia: Late Bronze Age Glass Beads Found in Denmark. *Journal of Archaeological Science* 54:168-181.

Chemical analysis of glass beads found in Denmark reveals surprising evidence for contact in the 14th-12th centuries BC between Egypt, Mesopotamia, and Denmark, indicating a complex and far-reaching trade network.

Varberg, Jeanette, Bernard Gratuze, Flemming Kaul, Anne Haslund Hansen, Mihai Rotea, and Mihai Wittenberger

2016 Mesopotamian Glass from Late Bronze Age Egypt, Romania, Germany, and Denmark. *Journal of Archaeological Science*; https://www.academia.edu/25914525/.

Traces the movement of early glass from its origin in Mesopotamia and Egypt into the Mediterranean, including centers such as Mycenae, and further towards Northern Europe and the Nordic Bronze Age culture. Beads are among the analyzed specimens.

Varsik, Vladimír, Ľudmila Illášová, and Ján Štubňa

2021 Koráliky z germánskej rezidencie v Cíferi-Páci (juhozápadné Slovensko) / Beads from the Germanic Residence at Cífer-Pác (Southwest Slovakia). *Archeologické rozhledy* LXXIII:72-101; https://www.academia.edu/64879251/.

The site yielded a variety of glass beads, as well as those made from rare materials (marble, carnelian) and materials that appear exotic in the barbarian territory north of the Danube (coral, jade). Absorption spectroscopy was used to analyze glass colorants. In Slovak with English abstract.

Veiga, J.P. and M.O. Figueiredo

2002 Sixteenth Century Tubular Glass Beads: Non-Destructive Chemical Characterization Using Synchrotron Radiation XRF. *X-Ray Spectrometry* 31(4):300-304.

Reports the results of a photon microprobe (synchrotron radiation XRF) study of blue glass beads of the Nueva Cadiz type uncovered in the center of Lisbon, Spain, aiming ultimately at ascertaining their provenance and place of manufacture.

2006 Copper Blue in an Ancient Glass Bead: a XANES Study. *Applied Physics A* 83(4):547-550; https://link.springer.com/article/10.1007/s00339-006-3540-1#citeas.
Reports on the composition of the blue (turquoise) layer of a "Nueva Cadiz" type tubular glass bead dated pre-17th century.

Velázquez Castro, Adrián, Norma Valentín Maldonado, and Belem Zúñiga Arellano
2012 Análisis con MEB de las huellas demanufactura de los objetos de concha de Teopancazco. In *Estudios arqueométricos del centro de barrio de Teopancazco en Teotihuacan,* edited by L.R. Manzanilla, pp. 285-310. Instituto de Investigaciones Antropológicas, Universidad Nacional Autónoma de México, México. https://www.academia.edu/13293578/.
Reports on SEM analysis of manufacturing traces on the shell pendants and other ornaments excavated in the Teopancazco district of Teotihuacan, Mexico.

Vellanoweth, René L.
2001 AMS Radiocarbon Dating and Shell Bead Chronologies: Middle Holocene Trade and Interaction in Western North America. *Journal of Archaeological Science* 28(9):941-950; https://www.academia.edu/47209288/.
Direct AMS radiocarbon dating can be used effectively to examine the stylistic evolution of shell beads and ornaments. As an example, eight *Olivella* grooved rectangle beads, collected from archaeological sites throughout western North America, were dated using the AMS technique. The results produced a consistent suite of dates, clustering between 4400 and 5400 cybp.

Velliky, Elizabeth C., Patrick Schmidt, Ludovic Bellot-Gurlet, Sibylle Wolf, and Nicholas J. Conard
2021 Early Anthropogenic Use of Hematite on Aurignacian Ivory Personal Ornaments from Hohle Fels and Vogelherd Caves, Germany. *Journal of Human Evolution* 150, 102900; https://doi.org/10.1016/j.jhevol.2020.102900.
This is the first study confirming the presence of anthropogenic ocher on Aurignacian-aged ivory beads from Europe.

Venclová, Natalie
2015 VITREA – Database of Chemical Analyses of Archaeological Glass. In *Structuring Archaeological Evidence: The Archaeological Map of the Czech Republic and Related Information Systems,* edited by Martin Kuna et al., pp. 135-140. Institute of Archaeology of the Czech Academy of Sciences, Prague.
The VITREA database includes the results of available chemical analyses of archaeological glass (including beads) conducted in the Czech Republic:
http://www.arup.cas.cz/VITREA/Index.htm.

2016 *Němčice and Staré Hradisko: Iron Age Glass and Glass-Working in Central Europe.* Archeologický ústav AV ČR, Prague.

Offers a detailed analysis of the glass beads recovered from the Němčice settlement and the oppidum of Staré Hradisko, Czech Republic, including the chemical composition of La Tène glass.

Venclová, Natalie, V. Hulínský, J. Henderson, S. Chenery, L. Šulová, and J. Hložek

2011 Late Bronze Age Mixed-Alkali Glasses from Bohemia / Skla typu *mixed alkali* mladší doby bronzové v Čechách. *Archeologické rozhledy* LXIII:559-585; https://www.academia.edu/17129479/.

Besides monochrome blue-green glass beads, polychrome beads appear for the first time in Bohemian prehistory in Late Bronze Age contexts of the Knovíz culture (Ha A, 12th-early 11th centuries BC). They are formally similar to the beads made in glass workshops in northern Italy. On the basis of chemical analyses, the beads from Bohemia correspond to the North Italian products because they have a mixed alkali composition, a compositional type unique for its time, thus providing evidence of a likely provenance. Czechia.

Venclová, Natalie, Václav Hulínský, and Šárka Jonášová

2014 Merovingian Glass Beads from Holubice in Moravia: Chemical and Technological View. In *Moravské křižovatky. Střední Podunají mezi pravěkem a historií,* edited by Jana Čižmářová, Natalie Venclová, and Gertrúda Březinová, pp. 815-826. Moravské zemské muzeum, Brno.

Dating to the first half of the 6th century AD, the majority of samples are natron glass; two are made of rare lead oxide-silica glass, and one is made of a heterogeneous material, perhaps the result of recycling.

Vercoutère, C., K. Müller, L. Chiotti, R. Nespoulet, A. Staude, H. Riesemeier, and I. Reiche

2011 Rectangular Beads from the Final Gravettian Level of the Abri Pataud: Raw Material Identification and its Archaeological Implications. *ArchéoSciences* 35:259-271.

The Final Gravettian level (level 2) of the abri Pataud (Dordogne, France) yielded a large assemblage of body ornaments that consists essentially of 85 quite standardized rectangular beads. Synchrotron and laboratory X-ray microtomography analysis revealed that most of them were made of ivory.

Verità, Marco

2013 Vitreous Beads: A Scientific Investigation by SEM Microscopy and X-Ray Microanalysis. In *Life and Death of a Rural Village in Garamantian Times: Archaeological Investigations in the Oasis of Fewet (Libyan Sahara),* edited by Lucia Mori, pp. 169-176. Arid Zone Archaeology, Monographs 6.

Reports on the chemical composition of 13 glass and faience beads excavated at Fewet.

Vilaça, Raquel and Francisco Gil

2023 El color del Mediterráneo en el Centro-interior del territorio portugués: Los primeros artefactos de vidrio y de *faiance*. In *Conexiones Culturales y Patrimonio Prehistórico*,

edited by Juan Manuel Garrido Anguita, pp. 21-38. Archaeopress, Oxford. https://www.academia.edu/97283899/.

Beads, the first glass artifacts to enter the territory of Portugal, appeared during the Bronze age. This article describes the beads recovered from various sites and reports their chemical composition.

Virgili, V. and M.F. Guerra

2008 Analysis of Gold Jewellery by PIXE and SEM-EDS: A Comparison of Ancient and Modern Productions. In *Proceedings of the 37th International Symposium on Archaeometry, 13th-16th May 2008, Siena, Italy*, edited by Isabella Turbanti-Memmi, pp. 637-641. Springer.

Provides a comparative compositional study of ancient (6th century BC) and modern (19th century) gold beads.

Volkov, P.V., O.A. Mitko, Yu. S. Gubar, R.V. Davydov, and I.S. Polovnikov

209 Технологический анализ украшений из бирюзы (по материалам находок из могильника скифского времени Ак-Даг I в Тыве). *Vestnik NGU. Series: History and Philology* 18(7):74-86; https://www.academia.edu/100796579/.

Reports on the elemental composition and manufacturing technology of turquoise jewelry found in Barrow 1 of the Scythian Ak-Dag I burial ground in Tyva, southern Siberia.

von Wedell, Christopher R.

2011 Methods of Dating Glass Beads from Protohistoric Sites in the South Platte River Basin, Colorado. M.A. thesis. Department of Anthropology, Colorado State University, Fort Collins.

Concludes that morphological and chemical characteristics of glass beads in dated contexts can be used to estimate the age of glass beads in undated contexts using linear regression. The results of this thesis demonstrate that morphological characteristics are currently more accurate and precise than chemistry (LA-ICP-MS analysis) although both methods hold potential for revision and improvement as more dated sites become available to supplement the statistical models.

Wade, Lizzie

2016 Neandertals made Jewelry, Proteins Confirm. *Science* 353(6306):1350.

Beads of animal teeth, shells, and ivory no more than a centimeter long found in the Grotte du Renne cave at Arcy-sur-Cure in central France were reportedly uncovered in the same layers as Neandertal fossils. Some have argued that Neandertals were incapable of the kind of symbolic expression reflected in jewelry and insisted that modern humans must have been the creators. Now, a pioneering study using ancient proteins to identify Neandertal bone fragments from the site for direct radiocarbon dating finds that the link between the archaic humans and the artifacts is real.

Wajda, Sylwia

2014 Wyroby szklane. In *Średniowieczne cmentarzysko w Czarnej Wielkiej, t. II* [Glassware: Medieval Burial Ground in Czarna Wielka, vol. 2], edited by Halina Karwowska, pp. 57-103. Muzeum Podlaskie w Białymstoku, Poland.

Describes a wide range of drawn, wound, and sintered glass beads from an early medieval site. Includes the results of detailed chemical analysis. In Polish with English summary.

Wajda, Sylwia and Paweł Gan

2021 Paciorki szklane z cmentarzyska kurhanowego w Lipsku-Polesiu. In *Unikatowe wczesnośredniowieczne cmentarzysko kurhanowe w Lipsku-Polesiu, gm. Zamość*, edited by Wojciech Borkowski and Wojciech Brzeziński, pp. 209-215. Materiały Starożytne i Wczesnośredniowieczne XII. https://www.academia.edu/81362915/.

Reports on the glass beads from the barrow cemetery in Lipsk-Polesie, eastern Poland. Includes information regarding production techniques and chemical composition.

Walder, Heather

2013 Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry (LA-ICP-MS) Analysis of Refired Glass Pendants from the North American Upper Great Lakes. In *Archaeological Chemistry VIII,* edited by Ruth Ann Armitage and James H. Burton, pp. 365-395. ACS Symposium Series 1147.

Indigenous people of the Upper Great Lakes region crushed and refired glass trade beads to produce new adornment forms during the late 17th and 18th centuries. LA-ICP-MS was used to assess the chemical composition of refired glass pendants and associated glass beads from four archaeological sites in Michigan and Wisconsin.

2013 Stylistic and Chemical Investigation of Turquoise-Blue Glass Artifacts from the Contact Era of Wisconsin. *Midcontinental Journal of Archaeology* 38(1):119-142.

To investigate regional differences among bead compositions, 87 turquoise-blue glass beads and 2 remelted glass pendants from five different 17th-century and early-to-mid-18th-century sites were analyzed nondestructively using LA-ICP-MS.

2014 Appendix: LA-ICP-MS Analysis of Blue Glass Beads from Peshtigo Point." *The Wisconsin Archeologist* 95(1):62-64.

2015 "…A Thousand Beads to Each Nation:" Exchange, Interactions, and Technological Practices in the Upper Great Lakes c. 1630-1730. Ph.D. dissertation. University of Wisconsin - Madison.

Addresses the timing of the introduction, exchange, and social implications of two complementary lines of evidence, reworked copper and brass objects and glass trade beads, from 38 archaeological sites in the Upper Great Lakes region dated to ca. 1630-1730. Includes compositional analysis.

2018 Small Beads, Big Picture: Assessing Chronology, Exchange, and Population Movement through Compositional Analyses of Blue Glass Beads from the Upper Great Lakes. *Historical Archaeology* 52(2):301-331.

Blue glass beads dating to AD 1630-1730 were analyzed using LA-ICP-MS analysis. Identified patterns of variation in glass bead composition reflect the timing and directions of trade among diverse communities, illustrating how a materials-science approach can reveal social and economic outcomes of intercultural interaction and colonialism.

2022 Seeking Indigenous Trade Networks of the Midcontinent through Glass Beads from *La Belle* (41 MG 86). In *Archaeologies of Indigenous Presence*, edited by Tsim D. Schneider and Lee M. Panich. University Press of Florida, Gainesville. https://www.academia.edu/70177157/.

Investigates Native American exchange relationships in North America's western Great Lakes region based on the composition of glass trade beads excavated from a French ship that sank off the coast of what is now Texas in 1686.

Walder, Heather, Alicia Hawkins, Brad Loewen, Laure Dussubieux, and Joseph A. Petrus

2021 Nueva Cadiz Beads in the Americas: A Preliminary Compositional Comparison. *Beads: Journal of the Society of Bead Researchers* 33:86-92; https://www.academia.edu/74314418/.

Compares the chemical composition of beads from Bolivia and Ontario, Canada, to explore their provenience and technology.

Walder, Heather and Stéphane Noël

2021 Compositional Analysis of Glass Beads from Huron-Wendat Contexts at the Notre-Dame-de-Lorette Mission Site, Quebec. *Canadian Journal of Archaeology* 45(2):135-157; https://doi.org/10.51270/45.2.135.

Determined using LA-ICP-MS, the compositions of drawn blue and white beads recovered from the site of a ca. 1673-1697 Huron-Wendat village are compared to those of similar beads from other 17th-century Wendat sites in the Western Great Lakes region and Southern Ontario.

Walder, Heather, J.A. Petrus, L. Dussubieux, R.G.V. Hancock, and A.L. Hawkins

2021 Comparing Chemistries: Inter-Laboratory Evaluation of Glass Bead Compositional Research in the Great Lakes Region. *Archaeometry* 63(6):1236-1254; https://doi.org/10.1111/arcm.12683.

Compares the results obtained by analyzing the same beads using INAA and LA-ICP-MS, and analyses undertaken at two LA-ICP-MS laboratories with differing data analysis protocols to determine if there is good comparability across methods and labs, which would make it possible to combine legacy and newly obtained data to explore interregional archaeological questions.

Walton, M.S., A. Shortland, S. Kirk, and P. Degryse

2009 Evidence for the Trade of Mesopotamian and Egyptian Glass to Mycenaean Greece. *Journal of Archaeological Science* 36(7):1496-1503; https://www.researchgate.net/publication/222243543.

The origins of the raw glass used to fashion Mycenaean beads are explored using trace elements analyzed by laser ablation ICP-TOFMS. Some of the beads have compositions that are consistent with an Egyptian origin while others conform to the composition of Mesopotamian glass. These data are the first to demonstrate direct and clear evidence for the trade of raw glass to the Mycenaean states.

Walz, Jonathan R. and Laure Dussubieux

2016 Zhizo Series Glass Beads at Kwa Mgogo, Inland NE Tanzania. *Journal of African Archaeology* 14(1):99-101.

Comments on the beads of glass, stone, shell, copper, and ostrich egg shell recovered from contexts attributed to the period from the mid-8th to the mid-10th century.

2022 Inland Glass Beads in Northeast Tanzania, 8th-17th Centuries CE. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 265-286. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.18.

Documents the chemical compositions of 62 glass beads from 11 archaeological sites to address their chronological associations and places of origin.

Wang, Bo and Lipeng Lu

2009 Glass Artifacts Unearthed from the Tombs at the Zhagunluke and Sampula Cemeteries in Xinjiang. In *Ancient Glass Research Along the Silk Road*, edited by Fuxi Gan, Robert Brill, and Tian Shouyun, pp. 299-329. World Scientific Publishing, Singapore.

On the glass beads recovered from two cemeteries in western China including chemical analysis.

Wang, Dong, Rui Wen, Julian Henderson, Xingjun Hu, and Wenying Li

2020 The Chemical Composition and Manufacturing Technology of Glass Beads Excavated from the Hetian Bizili Site, Xinjiang. *Heritage Science* 8:127; https://www.academia.edu/44830891/.

Located on the southern route of the Silk Road in western China, the Hetian Bizili site was a trade and cultural hub between the East and the West in ancient times. Analysis of a sample of beads recovered from 40 tombs revealed that all were Na_2O-CaO-SiO_2 glass with plant ash used as a flux. Lead antimonate and lead stannate were used as the opacifiying agents.

Wang, Kuan-Wen

2015 Scientific Analysis of Early Iron Age Glass Beads from Taiwan. *SAS Bulletin* 38(3):1-3; https://www.academia.edu/18122329/.

SEM-EDS and EPMA analyses were conducted on glass beads from four sites in Taiwan: Kiwulan (AD 700-1200), Kueishan (AD 400-700), Taoyeh (AD 200-600), and Wuchientso (AD 600-1000).

2016 Cultural and Socio-economic Interaction Reflected by Glass Beads in Early Iron Age Taiwan. Ph.D. thesis. Department of Archaeology, University of Sheffield.

This research studies glass beads from seven Iron Age sites on Taiwan in an attempt to determine the provenance and hence the exchange, consumption, and production of glass beads during the 1st millennium AD in Taiwan and the interaction with the South China Sea network.

Wang, Kuan-Wen, Yoshiyuki Iizuka, Yi-Kong Hsieh, Kun-Hsiu Lee, Kwang-Tzuu Chen, Chu-Fang Wang, and Caroline Jackson

2018 The Anomaly of Glass Beads and Glass Beadmaking Waste at Jiuxianglan, Taiwan. *Archaeological and Anthropological Sciences* 11(4):1391-1405; https://www.academia.edu/35960267/.

The 44 samples analyzed do not show a compositional or structural match between the glass beads and the glass waste, suggesting that the beads may not have been produced at this site.

Wang, Kuan-Wen, Yoshiyuki Iizuka, and Caroline Jackson

2022 The Production Technology of Mineral Soda Alumina Glass: A Perspective from Microstructural Analysis of Glass Beads in Iron Age Taiwan. *PLoS ONE* 17(2, e0263986; https://doi.org/10.1371/journal.pone.0263986.

SEM-EDS and EPMA were used to analyze red, orange, yellow, green, and blue m-Na-Al glass which is a common production group found around the Indo-Pacific region. In Iron Age Taiwan, its presence dates back to the early 1st millennium AD.

Wang, Kuan-Wen and Caroline Jackson

2014 A Review of Glass Compositions around the South China Sea Region (The Late 1st Millennium BC to the 1st Millennium AD): Placing Iron Age Glass Beads from Taiwan in Context. *Journal of Indo-Pacific Archaeology* 34:51-60; https://www.academia.edu/88702249/.

Reviews the chemical compositions of glass beads in Taiwan, Southeast Asia, and southern China in an attempt to understand the potential relationships between the three regions.

Wang, Kuan-Wen, Kun-Hsiu Lee, Kwang-Tzuu Chen, Yoshiyuki Iizuka, and Caroline Jackson

2018 The Exchange of Glass Beads Reflected by the Raw Materials and Craft of Glass Remains at Jiuxianglan. *Journal of Archaeology and Anthropology* 89:57-92; https://www.researchgate.net/publication/331008271.

Analysis of glass beads and beadmaking waste recovered from an Iron-Age site on Taiwan reveals that there is not a complete match of the chemical composition and the microstructure of the finished beads and waste. Therefore local production of beads here is not supported by the

evidence and the finished beads may have been imported from the South China Sea region. In Chinese with English abstract.

Wang, Kuan-Wen, Kuang-Ti Li, Yoshiyuki Iizuka, Yi-Kong Hsieh, and Caroline Jackson

2021 Glass Beads from Guishan in Iron Age Taiwan: Inter-Regional Bead Exchange between Taiwan, Southeast Asia and beyond. *Journal of Archaeological Science: Reports* 35, article 102737; https://www.academia.edu/44798935/.

Investigates the exchange of glass beads between Guishan, eastern Taiwan, and Southeast Asia by analyzing the styles, chemical composition, and microstructure of 64 glass beads using SEM-EDS, EPMA, and LA-ICP-MS. The results suggest that beads with an m-Na-Al glass and v-Na-Ca composition are the most common.

Wang, Xiaoqi, Yun'ao He, and Yuan Lin

2015 Scientific Study of Glass Artifacts from Yanliaofang, Nanjing City, China. *SAS Bulletin* 38(2):2-5.

The site produced glass beads dated to the 3rd-10th centuries AD. They were mostly monochrome dark red, translucent blue, opaque yellow, and translucent green, many of them remarkably tiny, and composed of Na_2O-Al_2O_3-CaO-SiO_2 glass, but their origin remains unclear.

Wang, Y., H. Ma, K. Chen, X. Huang, J. Cui, Z. Sun, and Q. Ma

2019 Identification of PbO (BaO) Faience from an Early and Middle Warring States Period Cemetery at Zhaitouhe, Northern Shaanxi, China. *Archaeometry* 61(1):43-54; https://www.academia.edu/42157562/.

The lead (and barium) vitreous beads discussed here are some of the earliest lead vitreous materials discovered in China so far, and therefore important for the study of the development of lead vitreous technologies in ancient China.

Wang, Yingzhu, Thilo Rehren, Yuchen Tan, Dexin Cong, Peter Weiming Jia, Julian Henderson, Hongjia Ma, Alison Betts, and Kunlong Chen

2020 New Evidence for the Transcontinental Spread of Early Faience. *Journal of Archaeological Science* 116, 105093; https://www.academia.edu/42127201/.

Compositional analysis of six faience beads from Adunqiaolu, an Early Bronze Age site in western Xinjiang, China, reveals that they were all made of mixed-alkali flux with sodium oxide 8-10% and potassium oxide 5-9%. As the earliest faience objects discovered in China so far, the Adunqiaolu beads set an essential starting point for the further discussion on the early exchange network evidenced by faience products and long-distance transmission of technologies and knowledge.

Warashina, T.

1997 Source Analysis of the Jade Comma-Shaped Beads and Jasper Tubular Beads Excavated at Ukikunden Site. *Saga Prefecture Museum Research Library* 22:3-64.

Japan. In Japanese.

2005 Source Analysis of the Beads and Chips of Beads Excavated from Archaeological Site in Shimane Prefecture. In *Study II of Bead Making in Ancient Izumo,* pp. 164-194. Center for Studies of the Ancient Culture, Shimane Prefecture, Matsue.
Japan. In Japanese.

Wärmländer, Sebastian K.T.S., Davide Zori, Jesse Byock, and David A. Scott
2010 Metallurgical Findings from a Viking Age Chieftain's Farm in Iceland. *Journal of Archaeological Science* 37:2284-2290; https://www.academia.edu/80955371/.
Also discusses the associated glass beads and their elemental composition.

Warner, Richard
2014 The Gold Ornaments from Rathgall: The Analytical Evidence for their Date and the Sources of their Gold. *Journal of Irish Archaeology* 23:243-255.
On the composition of six gold ornaments (including two beads) excavated from the middle/late Bronze Age hillfort in County Wicklow, Ireland. Analysis was by X-ray fluorescence spectrometry.

Watts, S., A. Pollard, and A.M. Pollard
1999 The Organic Chemistry of Jet: Porolysis-Gas Chromotography/Mass Spectrometry (PY-GCMS) Applied to Identifying Jet and Similar Black Lithic Materials: Preliminary Results. *Journal of Archaeological Science* 26(8):923-933.
The aim was to distinguish between jet, cannel coal, lignite, and torbanite, all materials used to make black shiny ornaments, including beads. Analyses were on a single geological sample of each material type but research demonstrates the potential for characterizing jet and other workable black lithic material.

Welter, N., U. Schüssler, and W. Kiefer
2007 Characterisation of Inorganic Pigments in Ancient Glass Beads by Means of Raman Microspectroscopy, Microprobe Analysis and X-ray Diffractometry. *Journal of Raman Spectroscopy* 38:113-121.
Ancient colored glass beads from Sri Lanka and Oman were analyzed by Raman microspectroscopy for identification of inorganic pigments in the glass. Calcium phosphate ($Ca_3(PO_4)_2$), cassiterite (SnO_2), cuprite (Cu_2O), and a $Pb(Sn,Si)O_3$-type lead tin oxide were found to be used as coloring agents. Moreover, a distinction between lead-based and alkali-based glass matrices could be made. Electron microprobe analysis and X-ray diffractometry were performed to show the capability of Raman microspectroscopy in comparison to these methods for answering archaeometric questions.

Wen, Rui, Zhi-qiang Zhao, Jian Ma, and Jian-xin Wang
2015 Chemical Analysis of Ancient Glass Beads from Shirenzigou Sites in Balikun County, Xinjiang. *Spectroscopy and Spectral Analysis* 36(09):2961-2965.

Analysis was conducted on glass beads from the tomb M011 at the Shirenzigou site and the tomb M1 at the Xigou site which can be dated to the late Warring States and early West Han dynasty (3rd-1st century BC).

2016 Scientific Analysis of the Glass Beads Unearthed from Tomb M1 at the Xigou Site in Barköl Kazakh Autonomous County, Hami Prefecture, Xinjiang Uygur Autonomous Region. *Wenwu* (Cultural Relics) 3-4:371-377.

Compositional analysis of 15 beads dating from the late Warring States period to the early Western Han dynasty suggests that they belong to the soda-lime type, which was the typical glass type in the West, implying that the beads were not produced in the Central Plains of China.

Westfall, Catherine, Mauricio Belmar, and Carlos González

2010 Aplicación geo-arqueológica de microscopía electrónica y microsonda en piezas metalográficas y líticas del cementerio regimiento Chorrillos de Calama. In *Actas XVII Congreso Nacional de Arqueología Chilena, Valdivia 2006,* Vol. 2, pp. 835-846.

Discusses the results of geo-archaeological analyses applied to decorative gold objects and stone beads found at a Formative period cemetery in Calama, northern Chile, and their implications for local prehistory.

White, Fred A.

2013 X-Ray Fluorescence Analysis on Sixteenth Century Glass Beads from the 1539 Hernando De Soto Encampment. Florida Department of State, Bureau of Archaeological Research, Master Site File MR03538. Tallahassee. https://www.academia.edu/5430797/.

The purpose of this project was to build an accurate reference database for the elemental values of four 16th-century seven-layer chevron beads related to Florida's First Spanish Cultural Period.

2017 Sixteenth Century European Artifacts from the Confirmed 8MR03538 De Soto Encampment Site with X-Ray Fluorescence Analysis. Florida Department of State, Bureau of Archaeological Research, Master Site File MR03538. Tallahassee. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2952522

Provides descriptions and images of the chevron and Nueva Cadiz beads and carnelian pendants found at the White Ranch/De Soto site in northern Florida (one of Hernando de Soto's 1539 camps) with X-ray fluorescence analysis of the chevron beads.

Whitford, Michelle F.

2016 Probing Beneath the Surface: A Study of Ancient Egyptian Faience. M.R. thesis. Department of Physics and Astronomy, Macquarie University, Sydney, Australia. http://hdl.handle.net/1959.14/1261036.

Investigates the chemical composition of three sets of Ancient Egyptian faience artifacts as well as the ageing processes of the faience. The findings may be of help in identifying fraudulent artifacts.

Whitford, Michelle F., Damian B. Gore, Mattias T. Johnsson, Ayse A. Bilgin, Ronika K. Powerd, Candace Richards, and Michael J. Withford

2021 A Complementary Validation of Egyptian Faience Jewellery Reconstruction Using Elemental and Statistical Analyses. *Journal of Archaeological Science: Reports* 38, 103087; https://doi.org/10.1016/j.jasrep.2021.103087.

The elemental compositions of nine beaded faience artifacts were measured to determine whether or not it was possible to infer the original arrangements of separate, multicomponent objects.

Wilk, Stanisław and Aldona Garbacz-Klempka

2016 Eneolithic Copper Jewellery from Grave 7 of the Lublin-Volhynian Culture at Site 2 in Książnice, Świętokrzyskie Province, Poland. Typological and Physical Metallurgy Characteristic. *L'Institut d'Archéologiede l'Université Jagellonne de Cracovie, Recherches Archéologiques* N.S. 8:29-46; https://www.academia.edu/34277007/.

Two tubular beads made of rolled sheet copper are included in the assemblage. Their chemical composition is discussed as is the distribution of these bead forms. *See also* Garbacz-Klempka (2017).

Wilmsen, Edwin, Laure Dussubieux, Thomas Huffman, and Marilee Wood

2018 Chemical Analyses of Glass Beads from Two Early Iron Age Sites in Zimbabwe: Zhizo Hill and Makuru. *Azania: Archaeological Research in Africa*; https://www.researchgate.net/publication/325827520

Considers the implications of the results of LA-ICP-MS bead analysis coupled with new radiocarbon dates from Makuru in the interpretation of beads in southern Africa.

Won-in, Krit, Somruedee Satitkune, Natthapong Monarumit, and Nontarat Nimsuwan

2017 Ancient Glass Bead from U-Thong Ancient City Site, Central Thailand. *Key Engineering Materials* 737:590-594; https://www.scientific.net/KEM.737.590.

Discusses the chemical composition of 30 samples and 12 colors from a site of the Dvaravati Period (6th-13th centuries).

Won-in, K., Y. Thongkam, W. Dhammanonda, J. Dutchaneephet, T. Kamwanna, S. Intarasiri, S. Tancharakorn, W. Tanthanuch, and P. Dararutana

2013 Characterization on Eye Glass Bead Found at Khao Sri Vichai (Surat Thani), Thailand. *Physics Procedia* 48:23-29.

Various analytical techniques were utilized to characterize the composition of glass eye beads with a black body and dark blue/ocher/white eyes.

Won-in, K., Y. Thongkam, T. Kamwanna, and P. Dararutana

2012 Characterization of Prehistorical Glass Beads Excavated from Khao Sam Kaeo (Chumphon, Thailand) Using PIXE and SEM-EDS. *Journal of Radioanalytical and Nuclear Chemistry* 294(2):247-250.

Compositional analysis revealed that copper was the principal colorant. Titanium, a common impurity in sand, was also present.

Wood, Marilee

2016 Eastern Africa and the Indian Ocean World in the First Millennium CE: The Glass Bead Evidence. In *Early Exchange between Africa and the Wider Indian Ocean World,* edited by Gwyn Campbell, pp. 173-193. Palgrave Macmillan, Basingstoke, UK.

Based on glass chemistry and method of manufacture, glass beads excavated at Unguja Ukuu, Zanzibar, provide a good deal of insight into East African trade with the Indian Ocean during the second half of the first millennium.

2019 Glass Beads and Trade in the Western Indian Ocean. *Asian History*; https://oxfordre.com/asianhistory/view/10.1093/acrefore/9780190277727.001.0001/acrefore-9780190277727-e-334.

Discusses the chemical composition of the glass beads found at archaeological sites up and down the eastern coast of Africa between the 7th and 17th centuries.

Wood, Marilee, Laure Dussubieux, and Peter Robertshaw

2012 The Glass of Chibuene, Mozambique: New Insights into Early Indian Ocean Trade. *South African Archaeological Bulletin* 67(195):59-74; https://www.researchgate.net/publication/265050510.

LA-ICP-MS analysis of glass beads, vessel shards, and wasters from the site has brought to light a new bead series (Chibuene) for the region that may push trade there back to the 7th century.

Wood, Marilee, Laure Dussubieux, Mudit Trivedi, and Martial Pauly

2022 Morphology and Elemental Composition: Provenancing Glass Beads from 12th-13th Century Mayotte. In *The Elemental Analysis of Glass Beads: Technology, Chronology and Exchange*, edited by Laure Dussubieux and Heather Walder, pp. 323-344. Studies in Archaeological Sciences, Leuven University Press, Leuven. https://doi.org/10.2307/j.ctv2z9fzr0.21.

Beads recovered from a graveyard on one of the islands in the Comoros Archipelago off the coast of Mozambique were analyzed using LA-ICP-MS to help determine the region where the glass was manufactured.

Wood, Marilee, Laure Dussubieux, and Lyn Wadley

2009 A Cache of ~5000 Glass Beads from the Sibudu Cave Iron Age Occupation. *South African Humanities* 21:239-261; https://www.academia.edu/7045146/.

This site in South Africa produced strings of various colors of glass beads, some copper beads, and also two perforated *Conus ebraeus* shells. A necklace of shell disc-beads interspersed with blue glass beads was also present. Sixteen of the beads were analyzed chemically using LA-ICP-MS. The results indicate the beads originated in India.

Wood, Marilee, Laure Dussubieux, Stephanie Wynne-Jones, and Jeffrey Fleisher

2022 Glass Beads from Songo Mnara, Tanzania: Chemical Composition and Evidence for Local Bead Manufacture. *African Archaeological Review* 40(2):357-376; https://doi.org/10.1007/s10437-022-09484-8.

LA-ICP-MS analysis of 15th-century beads revealed the presence of four main glass types: mineral soda-high alumina (m-Na-Al), vegetable soda-high alumina (v-Na-Al), high lead glasses, and vegetable soda-lime (v-Na-Ca) glass. Among the high-lead glass beads are two types from China, while trail-decorated folded beads may have been made locally from imported v-Na-Al glass.

Wood, Marilee, Serena Panighello, Emilio F. Orsega, Peter Robertshaw, Johannes T. van Elteren, Alison Crowther, Mark Horton, and Nicole Boivin

2017 Zanzibar and Indian Ocean Trade in the First Millennium CE: The Glass Bead Evidence. *Archaeological and Anthropological Sciences* 9:879-901; https://www.academia.edu/48854711/.

A sample of the beads recovered from the 7th- to 10th-century sites of Unguja Ukuu and Fukuchani on Zanzibar Island was analyzed by LA-ICP-MS to determine the origins of the glass, and potential trade relationships are considered.

Wood, Nigel, Ian C. Freestone, and Colleen P. Stapleton

1999 Early Polychrome Glazes on a Chinese Ceramic Bead of the Warring States Period. https://www.academia.edu/12081086/.

Some unusual Chinese ceramic beads produced in imitation of Western glass eye beads appear to represent extremely early examples of low temperature glazing.

Wriston, Teresa Ann

2013 The Late Stone Age to Early Iron Age in Hwange National Park, Zimbabwe: Using Archaeology, Soils, Sediments, and Stable Isotopes to Trace Past Peoples and Environments. Ph.D. dissertation. Department of Anthropology, University of Nevada, Reno. https://www.academia.edu/70699921/.

Strontium, carbon, and oxygen isotopes extracted from ostrich eggshell artifacts show that some of them were imported while others are of local origin.

Xu, Siwen, Baotong Qiao, and Yimin Yang

2022 The Rise of the Maritime Silk Road about 2000 Years Ago: Insights from Indo-Pacific Beads in Nanyang, Central China. *Journal of Archaeological Science: Reports* 42, 103383; https://doi.org/10.1016/j.jasrep.2022.103383.

Analysis of light-blue Indo-Pacific beads of the Han Dynasty reveals they have low Cu and high Pb concentrations and were probably produced in South China.

Xu, Siwen, Bo Wang, Bin Han, and Yimin Yang

2022 The Production of Indo-Pacific Monochrome Drawn Glass Beads in the Sasanian Empire: Insights from Xinjiang, Northwest China. *Ceramics International*; https://doi.org/10.1016/j.ceramint.2022.05.287.

Compositional analysis of 15 beads from the Astana necropolis (ca. 4th-8th centuries CE) revealed that most of the beads share similar compositions with glassware from Veh Ardašīr, a famous Sasanian site in present-day Iraq.

Yamahana, Kyoko

2019 Study of Ancient Egyptian Beads Made of Sulfur. *Journal of the Japan Society for the Conservation of Cultural Property* 62:28-42; https://www.academia.edu/42168043/.

Discusses two necklaces of sulfur beads in the Ancient Egyptian and Near Eastern Collection at Tokai University, Japan, including their composition. In Japanese with English abstract.

Yamahana, Kyoko and Yasunobu Akiyama

2020 Ancient Egyptian Sulfur Beads. *Beads: Journal of the Society of Bead Researchers* 32:15-24; https://www.academia.edu/49044984/.

Reports on the compositional analysis of sulfur beads in the Ancient Egyptian and Near Eastern Collection at Tokai University, Japan, and investigates potential production techniques.

Yamasaki, K.

1987 A Chemical Study of Red Glass Beads of Arikamedu. In *Archaeometry of Glass,* edited by H.C. Bhardwaj, p. 63. Indian Ceramic Society, Calcutta.

Yanase, Kazuya, Mayumi Matsuzaki, Daichi Sawamura, Izumi Nakai, Kazuyuki Nakamura, and Kenji Morioka

2015 Characterization of Ancient Japanese Glass Excavated from Archaeological Sites of the Epi-Jomon Period in Hokkaido by XRF Analysis. *Bunseki Kagaku* (Japan Analyst) 64(5):371-377.

The chemical compositions of the beads reveals two glass types: potash-silica (K_2O-SiO_2) and soda-lime-silica (Na_2O-CaO-SiO_2). In Japanese.

Yang, Yimin

2020 Archaeometry Should be Based on Archaeology. A Comment on Lin et al. (2019). *Journal of Archaeological Science* 119, 105149; https://doi.org/10.1016/j.jas.2020.105149.

A critical evaluation of "The Beginning of Faience in China: A Review and New Evidence."

Yang, Yimin, Lihua Wanga, Shuya Weia, Guoding Song, J. Mark Kenoyer, Tiqiao Xiao, Jian Zhu, and Changsui Wang

2013 Nondestructive Analysis of Dragonfly Eye Beads from the Warring States Period, Excavated from a Chu Tomb at the Shenmingpu Site, Henan Province, China. *Microscopy and Microanalysis* 19(2):335-343.

Dragonfly-eye beads are considered to be the earliest types of glass objects in China, and in the past have been considered as evidence of culture interaction or trade between West and East Asia. However, synchrotron radiation microcomputed tomography and μ-probe energy dispersive X-ray fluorescence analysis of four dragonfly-eye beads indicates that these beads were not imported from the West.

Yamahana, Kyoko and Yasunobu Akiyama

2022 Replicating Glass Beads from the Tokai University Andean Collection. *Glass* 66:35-48; https://www.academia.edu/77269915/.

Reports on the chemical composition and likely method of manufacture of early 20th-century beads comprising a necklace purportedly collected in the Andean region of South America. In Japanese with English summery.

Yang, Ju, Hong-Xia Zhao, and Pu Yu

2012 Analysis of Composite Glass Beads (Eye-Beads) Unearthed from the Shahe Tomb in the Changping District of Beijing. *Sciences of Conservation and Archaeology* 2.

Belonging to the Qing Dynasty, the beads belong to the Na_2O-CaO-SiO_2 glass type with Cu and Co as the major colorant elements.

Yatsuk, Oleh

2018 6th Century BC Glass Beads from Southern Ukraine: Raw Materials and Technology. M.A. thesis. Department of Archeology and Environment, University of Évora, Évora.

A multi-analytical approach that compares the chemical and mineralogical composition of glass beads from a glass-making site at Yahorlyk Bay on the Black Sea with that of sand collected in the vicinity was used to determine the local or non-local origin of the beads.

Yatsuk, Oleh, Astrik Gorghinian, Giacomo Fiocco, Patrizia Davit, Serena Francone, Alessandra Serges, Leonie Koch, Alessandro Re, Alessandro Lo Giudice, Marco Ferretti, Marco Malagodi, Cristiano Iaia, and Monica Gulmini

2023 Ring-Eye Blue Beads in Iron Age Central Italy – Preliminary Discussion of Technology and Possible Trade Connections. *Journal of Archaeological Science: Reports* 47, 103763; https://www.sciencedirect.com/science/article/abs/pii/S2352409X22004266.

Archaeometric analysis established that the beads are soda-lime-silica glass and the source of cobalt colorant could be an ore from Egypt.

Yatsuk, Oleh, Leonie Koch, Astrik Gorghinian, Giacomo Fiocco, Patrizia Davit, Lorena Carla Giannossa, Annarosa Mangone, Serena Francone, Alessandra Serges, Alessandro Re, Alessandro Lo Giudice, Marco Ferretti, Marco Malagodi, Cristiano Iaia, and Monica Gulmini

2023 An Archaeometric Contribution to the Interpretation of Blue-Green Glass Beads from Iron Age Central Italy. *Heritage Science* 11, 113; https://www.academia.edu/102100777/.

The beads were studied using a range of spectroscopic techniques, revealing information concerning the raw materials employed for primary glass production and the likely source of some of the glasses.

Yi, Jeongeun, Hye R. Yang, and Chan H. Lee

2021 Compositional Variation and Color Diversity of Glass Beads from the 4th Century Tomb Complex in Korea. *Applied Sciences* 11, 5233; https://doi.org/10.3390/app11115233.

Fragments in blue-green beads from Tomb 11 at the Suchonri site were identified as potash glass, whereas other samples were soda glass.

Yokoyama, Tomonori, Yasunobu Akiyama, Kyoko Yamahana, Takashi Asaka, Masashi Higuchi, and Masahi Sato

2019 Study of Ancient Egyptian Beads Made of Sulfur. *Bunkazai Hozon Shūfuku Gakkaishi* 62:28-42; https://www.academia.edu/42168043/.

Reports on the method of manufacture, dating, and composition of the sulfur beads comprising a necklace in the Ancient Egyptian and Near Eastern Collection at Tokai University. In Japanese with English abstract.

Yong, Lei and Xia Yin

2015 Study on Production Techniques and Provenance of Faience Beads Excavated in China. *Journal of Archaeological Science* 53:32-42; https://doi.org/10.1016/j.jas.2014.09.019.

Faience beads excavated in China can be classified into two groups: soda-enriched made somewhere on the route from Egypt to central China (11-10th century BCE) and potash-enriched made in China (middle Western Zhou to Eastern Zhou).

Yu, Heisun and Jihyun Ro

2018 A Study on the Provenance of an Opacifying Agent ($PbSnO_3$) in Yellow and Green Glass Beads Excavated from the Korean Peninsula. *Journal of Archaeological Science* 34(4):305-311; https://doi.org/10.12654/JCS.2018.34.4.06.

Analysis determined that the lead provenience of the glass beads was Thailand (Kanchanaburi Province). In Korean with English abstract.

Yun, Ji Hyeon, Woo Rim Han, and Min Su Han

2018 Compositions and Characteristics on the Glass Beads Excavated from Ancient Tombs of Jeongchon in Naju, Korea. *Journal of Conservation Science* 34(2):119-128; https://www.e-jcs.org/journal/view.php?doi=10.12654/JCS.2018.34.2.06.

Glass beads of the Mahan-Baekje period were found to represent several glass groups: soda, potash, mixed alkali, and lead barium. In Korean with English abstract.

Yun, Ji Hyeon and Gyu Ho Kim

2016 Compositions and Characteristics on the Glass Beads from Jeongjang-ri Site in Geochang, Korea. *Journal of Conservation Science* 2016 32(1):63-73; https://www.e-jcs.org/journal/view.php?number=596.

Five bead types are represented by soda glass, potash glass, and lead-barium glass. In Korean with English abstract.

Yuryeva, Tatyana V., I.B. Afanasyev, E.A. Morozova, I. Kadikova, and V.S.Popov

2017 $KSbOSiO_4$ Microcrystallites as a Source of Corrosion of Blue-Green Lead-Potassium Glass Beads of the 19th Century. *Journal of Applied Physics* 121(1), 014902; https://www.academia.edu/41966163/.

Proposes that individual precipitates of $KSbSiO_4$, especially their clusters, play a major role in the deterioration of blue-green glass beads as a result of slow internal corrosion.

Yuryeva, Tatyana V., I.B. Afanasyev, E.A. Morozova, I.F. Kadikova, V.S. Popov, and V.A. Yuryev

2016 A Study of Deterioration and Destruction of Historic Blue-Green Glass Beads of the 19th Century: Identification of Microcrystallites in the Glass Matrix. arXiv:1609.02101; https://arxiv.org/abs/1609.02101v1.

Presents the results of a study of the elemental and phase composition of deteriorating 19th-century blue-green beads from exhibits in Russian museums.

Yuryeva, Tatyana V., I. Kadikova, E.A. Morozova, I.B. Afanasyev, I.A. Balakhnina, N.N. Brandt, and V.A. Yuryev

2017 Nano and Microcrystallites of $KSbOSiO_4$ in Glass Matrix as a Source of Internal Strain and Fatal Corrosion of Historic Turquoise Glass. *Proceedings of SPIE - The International Society for Optical Engineering* 10248, Nanotechnology VIII:102480K; https://www.researchgate.net/publication/317185467.

Concludes that $KSbOSiO_4$ (KSS) precipitates and their clusters give rise to internal glass corrosion in 19th-century turquoise-colored beads. K and Sb being glass dopants form KSS crystallites during glass melt cooling; tensile strain arising in the glass matrix gives rise to glass cracking and eventually to its rupture and formation of heterogeneous grains.

Yuryeva, Tatyana V., I. Kadikova, E.A. Morozova, D.O. Klyuchnikova, I.B. Afanasyev, I.A. Grigorieva, M.V. Lukashova, S.A. Malykhin, O.V. Uvarov, and V.A. Yuryev

2018 Кристаллиты, образующиеся при варке цветного стекла, как источник внутренних напряжений и коррозии исторического стеклянного бисера XIX века [Crystallites Formed during Melting of Color Glass as a Source of Internal Stresses and Corrosion of Historical Glass Beads of the 19th Century]. Paper presented at the IX Grabar's Readings, Moscow. https://www.researchgate.net/publication/329564665.

Reveals what causes turquoise-colored glass beads to crack and deteriorate. Many examples are shown. In Russian with English abstract.

Yuryeva, Tatyana V., I. Kadikova, E.A. Morozova, D.O. Klyuchnikova, I.B. Afanasyev, I.G. Shpachenko, I.A. Balakhnina, N.N. Brandt, A.D. Yaprintsev, I.A. Grigorieva, M.V. Lukashova, S.A. Malykhin, R.A. Khmelnitsky, A.V. Ryabova, O.V. Uvarov, and V.A. Yuryev

2017 Комплексное исследование физико-химических процессов, приводящих к разрушению исторического стеклянного бисера XIX века [A Comprehensive Study of the Physicochemical Processes Leading to the Destruction of Historical Glass Beads of the 19th Century]. https://www.researchgate.net/publication/321913281

Discusses the degradation and decay of blue-green glass beads obtained from museum exhibits. In Russian.

Yuryeva, Tatyana V., E.A. Morozova, I. Kadikova, O.V. Uvarov, I.B. Afanasyev, A.D. Yaprintsev, M.V. Frolenkova, S.A. Malykhin, I.A. Grigorieva, and V.A. Yuryev

2018 Microcrystals of Antimony Compounds in Lead-Potassium and Lead Glass and their Effect on Glass Corrosion: A Study of Historical Glass Beads Using Electron Microscopy. *Journal of Materials Science* 53(15):10692-10717; https://www.researchgate.net/publication/324538790.

Microcrystallites of orthorhombic $KSbOSiO_4$ (KSS) of sizes ranging from about 200 nm to several micrometers have been detected in turquoise-colored glass seed beads prone to glass disease on 19th-century beaded objects in museum collections.

Yuryeva, Tatyana V. and Vladimir A. Yuryev

2014 Degradation and Destruction of Historical Blue-Green Glass Beads: A Study by Micro-spectroscopy of Light Transmission. *Journal of Optics* 16(5):055704. arXiv:1401.3123

Explores the internal microstucture of degrading blue-green historical beads and its evolution in the process of bead deterioration. Possible physical factors resulting in the destruction of the beads are discussed.

Zacharias, N., K. Beltsios, A. Oikonomou, A.G. Karydas, Y. Bassiakos, C.T. Michael, and C. Zarkadas

2008 Solid-State Luminescence for Optical Examination of Archaeological Glass Beads. *Optical Materials* 30(7):1127-1133; https://www.academia.edu/57806655/.

Considered as unique in terms of typological variety and time span, glass beads excavated at Thebes, Greece, were examined using luminescence techniques (thermoluminescence, optically stimulated luminescence). Additionally, X-ray fluorescence (XRF) was used to provide the elemental concentration profile of the samples.

Zacharias, Nikolaos, Maria Kaparou, Artemios Oikonomou, and Zs. Kasztovszky

2018 Mycenaean Glass from the Argolid, Peloponnese, Greece: A Technological and Provenance Study. *Microchemical Journal* 141:404-417; https://www.academia.edu/36897203/.

Analysis of beads and plaques dating between 1600 and 1060 BCE identified two major compositional groups, with at least the one associated with artifacts originating in Egypt.

Zacharias, Nikolaos, Eleni Palamara, Rania Kordali, and Vanessa Muros

2020 Archaeological Glass Corrosion Studies: Composition, Environment and Content. *Scientific Culture* 6(3):53-67; https://www.academia.edu/49045241/.

Highlights the complexity of corrosion phenomena and the effect of various parameters on the degradation of buried archaeological glass through the analysis of objects (beads included) from sites in Greece dating from the Late Bronze Age to the Ottoman period.

Zapatero Magdaleno, María Pilar and Mercedes Murillo Barroso

2017 Determinación de procedencia mediante análisis por Espectroscopía FTIR, del ámbar de una cuenta de collar del sepulcro megalítico de La Velilla (Osorno, Palencia). *BSAA arqueología* LXXXIII:71-94; https://www.academia.edu/36507836/.

On the determination of the provenience by FTIR Spectroscopy of an amber bead from the megalithic tomb of La Velilla in north-central Spain.

Zerboni, Andrea, Sandro Salvatori, Pietro Vignola, and Abd el Rahman Ali Mohammed

2018 The Long-Distance Exchange of Amazonite and Increasing Social Complexity in the Sudanese Neolithic. *Antiquity* 92(365):1195-1209; https://doi.org/10.15184/aqy.2018.196.

Geochemical analyses of North and East African raw amazonite outcrops and artifacts (beads included) found at Neolithic cemetery R12 in the Sudanese Nile Valley reveals southern Ethiopia as the source of the R12 amazonite.

Zerboni, Andrea and Pietro Vignola

2013 Garamantian Green Stone Beads from Fewet. In *Life and Death of a Rural Village in Garamantian Times. Archaeological Investigations in the Fewet Oasis (Lybian Sahara)*, edited by Lucia Mori, pp. 5-13. Edizioni All'Insegna del Giglio, Firenze.

The first archaeometric study carried out on green-stone beads found at Garamantian archaeological sites in the central Sahara.

Zerboni, Andrea, Pietro Vignola, Maria C. Gatto, Andrea Risplendente, and Lucia Mori

2017 Searching for the Garamantian Emerald: Reconsidering the Green-Colored Stone Beads Trade in the Ancient Sahara. *The Canadian Mineralogist* 55(4):651-668; https://www.academia.edu/94683887/.

The composition of green-colored stone beads found at Fewet, a Garamantian site (2nd century BC-1st century AD) in the Libyan Sahara reveals they consist of serpentinite and amazonite.

Zhang, Fu-Kang, Zhu-Hai Cheng, and Zhi-Gang Zhang

1983 An Investigation of Ancient Chinese "Liuli." *Journal of The Chinese Ceramic Society* 1.

This study reveals that beads excavated from tombs of the West Zhou Dynasty are not glass but composed of quartz granules fused together by a small amount of flux. Thus it appears that the original belief that Chinese glass manufacture originated during the West Zhou Dynasty is incorrect.

Zhang, Zhiguo and Qinglin Ma

2009 Faience Beads of the Western Zhou Dynasty Excavated in Gansu Province, China: A Technical Study. In *Ancient Glass Research Along the Silk Road*, edited by Gan Fuxi, Robert Brill, and Tian Shouyun, pp. 275-289. World Scientific Publishing, Singapore.

Discusses the chemical composition and manufacturing technology.

Zhao, Hongxia, Huansheng Cheng, Qinghui Li, and Fuxi Gan

2011 Nondestructive Identification of Ancient Chinese Glasses by Raman and Proton-Induced X-ray Emission Spectroscopy. *Chinese Optics Letters* 9(3):1-4.

The samples were primarily plain and eye beads recovered from sites in Henan, Hubei, and Jiangsu, China. They are assigned to three glass systems.

Zhao, H.X., Q.H. Li, S. Liu, and F.X. Gan

2013 Characterization of Microcrystals in Some Ancient Glass Beads from China by Means of Confocal Raman Microspectroscopy. *Journal of Raman Spectroscopy* 44(4):643-649; https://www.academia.edu/37185642/.

The beads were excavated from different regions of China, including Xinjiang, Henan, Hubei, and Guangxi provinces, and date mainly to the 10th century BC to the 9th century AD.

Zhao, Hongxia, Qinghui Li, S. Liu, L. Li, and F.X. Gan

2014 In Situ Analysis of Stratified Glass Eye Beads from the Tomb of Marquis Yi of the Zeng State in Hubei Province, China Using XRF and Micro-Raman Spectrometry. *X-Ray Spectrometry* 43(6).

Dating to the Warring States Period, most of the beads belong to the typical soda-lime-silicate glasses with low amounts of MgO and K_2O.

Zhou, Chunhui, Gregory Hodgins, Todd Lange, Kazuko Saruwatari, Nicholas Sturman, Lore Kiefert, and Klaus Schollenbruch

2017 Saltwater Pearls from the Pre- to Early Columbian Era: A Gemological and Radiocarbon Dating Study. *Gems & Gemology* LIII:286-295; https://www.academia.edu/75004644/.

^{14}C isotope radiocarbon dating of saltwater natural pearls (some perforated) purportedly collected in Central or South America during the early 16th century corroborates their claimed age.

Zlámalová Cílová, Zuzana, Viktoria Čist'akova, Romana Kozáková, and Ladislav Lapčák

2022 Chemistry and Production Technology of Hallstatt Period Glass Beads from Bohemia. *Materials* 15, 5740; https://www.academia.edu/85165014/.

Discusses the opacifying agents, including the possible ways in which they entered the glass, as well as the techniques used to produce the beads which include monochrome and eye varieties.