

# ARCLG347: Laboratory and instrumental skills in archaeological science

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@article{Abe\_Nakai\_Takahashi\_Kawai\_Yoshimura\_2009, title={On-site analysis of archaeological artifacts excavated from the site on the outcrop at Northwest Saqqara, Egypt, by using a newly developed portable fluorescence spectrometer and diffractometer}, volume={395}, DOI={10.1007/s00216-009-3141-x}, number={7}, journal={Analytical and Bioanalytical Chemistry}, author={Abe, Yoshinari and Nakai, Izumi and Takahashi, Kazumitsu and Kawai, Nozomu and Yoshimura, Sakuji}, year={2009}, pages={1987-1996} }

@article{Adriaens\_2005, title={Non-destructive analysis and testing of museum objects: An overview of 5 years of research}, volume={60}, DOI={10.1016/j.sab.2005.10.006}, number={12}, journal={Spectrochimica Acta Part B: Atomic Spectroscopy}, author={Adriaens, Annemie}, year={2005}, month={Dec}, pages={1503-1516} }

@article{Alexander\_Bentley\_2006, title={Strontium Isotopes from the Earth to the Archaeological Skeleton: A Review}, volume={13}, DOI={10.1007/s10816-006-9009-x}, number={3}, journal={Journal of Archaeological Method and Theory}, author={Alexander Bentley, R.}, year={2006}, month={Sep}, pages={135-187} }

@book{Arthur\_M.\_Sackler\_Colloquia\_of\_the\_National\_Academy\_of\_Sciences\_National\_Academy\_of\_Sciences\_(U.S.)\_2005, address={Washington, D.C.}, title={Scientific examination of art: modern techniques in conservation and analysis : National Academy of Sciences, Washington, D.C., March 19-21, 2003}, publisher={National Academies Press}, author={Arthur M. Sackler Colloquia of the National Academy of Sciences and National Academy of Sciences (U.S.)}, year={2005} }

@book{Artioli\_Angelini\_2010, address={Oxford}, title={Scientific methods and cultural heritage: an introduction to the application of materials science to archaeometry and conservation science}, url={http://UCL.eblib.com/patron/FullRecord.aspx?p=618614}, publisher={Oxford University Press}, author={Artioli, Gilberto and Angelini, Ivana}, year={2010} }

@book{Baxter\_1994, address={Edinburgh}, title={Exploratory multivariate analysis in archaeology}, url={https://www.jstor.org/stable/j.ctv2sx9gfb}, publisher={Edinburgh University Press}, author={Baxter, M. J.}, year={1994} }

@book{Baxter\_2003, address={London}, title={Statistics in archaeology}, volume={Arnold applications of statistics}, publisher={Arnold}, author={Baxter, M. J.}, year={2003} }

@inbook{Baxter\_Buck\_2000, address={New York}, title={Data handling and statistical

analysis}, volume={Chemical analysis}, url={<https://contentstore.cla.co.uk/secure/link?id=5381c5cf-6c15-e811-80cd-005056af4099>}, booktitle={Modern analytical methods in art and archaeology}, publisher={Wiley}, author={Baxter, M. J. and Buck, C. E.}, year={2000}, pages={681-746} }

@article{BAXTER\_FREESTONE\_2006, title={LOG-RATIO COMPOSITIONAL DATA ANALYSIS IN ARCHAEOOMETRY\*}, volume={48}, DOI={10.1111/j.1475-4754.2006.00270.x}, number={3}, journal={Archaeometry}, author={BAXTER, M. J. and FREESTONE, I. C.}, year={2006}, pages={511-531} }

@article{Ben-David\_Flaherty\_2012, title={Stable isotopes in mammalian research: a beginner's guide}, volume={93}, DOI={10.1644/11-MAMM-S-166.1}, number={2}, journal={Journal of Mammalogy}, author={Ben-David, Merav and Flaherty, Elizabeth A.}, year={2012}, month={Apr}, pages={312-328} }

@book{Bowman\_1991, address={London}, title={Science and the past}, publisher={British Museum Press}, author={Bowman, Sheridan}, year={1991} }

@book{Brothwell\_Pollard\_2001a, address={Chichester}, title={Handbook of archaeological sciences}, publisher={John Wiley}, author={Brothwell, Don R. and Pollard, A. M.}, year={2001} }

@book{Brothwell\_Pollard\_2001b, address={Chichester}, title={Handbook of archaeological sciences}, publisher={John Wiley}, author={Brothwell, Don R. and Pollard, A. M.}, year={2001} }

@article{Chaplin\_Clark\_MartinÃ3n-Torres\_2010, title={A combined Raman microscopy, XRF and SEM-EDX study of three valuable objects - A large painted leather screen and two illuminated title pages in 17th century books of ordinances of the Worshipful Company of Barbers, London}, volume={976}, DOI={10.1016/j.molstruc.2010.03.042}, number={1-3}, journal={Journal of Molecular Structure}, author={Chaplin, Tracey D. and Clark, Robin J.H. and MartinÃ3n-Torres, Marcos}, year={2010}, month={Jul}, pages={350-359} }

@article{Charalambous\_Kassianidou\_Papasavvas\_2014, title={A compositional study of Cypriot bronzes dating to the Early Iron Age using portable X-ray fluorescence spectrometry (pXRF)}, volume={46}, DOI={10.1016/j.jas.2014.03.006}, journal={Journal of Archaeological Science}, author={Charalambous, Andreas and Kassianidou, Vasiliiki and Papasavvas, George}, year={2014}, month={Jun}, pages={205-216} }

@article{Charlton\_BlakeLock\_Martinon-Torres\_2012, title={Investigating the production provenance of iron artifacts with multivariate methods}, volume={39}, url={<http://discovery.ucl.ac.uk/1375923/1/1375923.pdf>}, number={7}, journal={Journal of Archaeological Science}, author={Charlton, M. F. and Blakelock, E. and Martinon-Torres, M.}, year={2012}, pages={2280-2293} }

@inbook{Chippindale\_2006, address={Lanham, Md}, title={Colleagues, talking, writing, publishing}, volume={2}, url={<https://contentstore.cla.co.uk/secure/link?id=d9c1e291-e30c-e811-80cd-005056af4099>}, booktitle={Handbook of archaeological methods}, publisher={Altamira Press}, author={Chippindale, C.}, year={2006}, pages={1339-1371} }

@book{Ciliberto\_Spoto\_2000, address={New York}, title={Modern analytical methods in art and archaeology}, volume={Chemical analysis}, publisher={Wiley}, author={Ciliberto, E. and Spoto, G.}, year={2000} }

@article{Colombo\_Bracci\_Conti\_Greco\_Realini\_2011, title={Non-invasive approach in the study of polychrome terracotta sculptures: employment of the portable XRF to investigate complex stratigraphy}, volume={40}, DOI={10.1002/xrs.1336}, number={4}, journal={X-Ray Spectrometry}, author={Colombo, C. and Bracci, S. and Conti, C. and Greco, M. and Realini, M.}, year={2011}, month={Jul}, pages={273-279} }

@article{Contrey\_Goodman-Elgar\_Bettencourt\_Seyfarth\_Van Hoose\_Wolff\_2014, title={Calibration of a portable X-ray fluorescence spectrometer in the analysis of archaeological samples using influence coefficients}, volume={14}, url={http://geea.lyellcollection.org.libproxy.ucl.ac.uk/content/14/3/291.full.pdf}, number={3}, journal={Geochemistry: Exploration, Environment, Analysis}, author={Contrey, R.M and Goodman-Elgar, M and Bettencourt, N and Seyfarth, A and Van Hoose, A and Wolff, J.A}, year={2014} }

@article{Cotte\_Dumas\_Taniguchi\_Checroun\_Walter\_Susini\_2009, title={Recent applications and current trends in Cultural Heritage Science using synchrotron-based Fourier transform infrared micro-spectroscopy}, volume={10}, DOI={10.1016/j.crhy.2009.03.016}, number={7}, journal={Comptes Rendus Physique}, author={Cotte, Marine and Dumas, Paul and Taniguchi, Yoko and Checroun, Emilie and Walter, Philippe and Susini, Jean}, year={2009}, pages={590-600} }

@inbook{De Atley\_Bishop\_1991, address={Niwot, Colo}, title={Toward an integrated interface for archaeology and archaeometry}, url={https://contentstore.cla.co.uk/secure/link?id=724ac537-6915-e811-80cd-005056af4099}, booktitle={The ceramic legacy of Anna O. Shepard}, publisher={University Press of Colorado}, author={De Atley, S.P. and Bishop, R.L.}, year={1991}, pages={358-381} }  
 @article{De Benedetto\_Laviano\_Sabbatini\_Zambonin\_2002, title={Infrared spectroscopy in the mineralogical characterization of ancient pottery}, volume={3}, DOI={10.1016/S1296-2074(02)01178-0}, number={3}, journal={Journal of Cultural Heritage}, author={De Benedetto, G.E. and Laviano, R. and Sabbatini, L. and Zambonin, P.G.}, year={2002}, pages={177-186} }

@inbook{Degryse\_2013, address={Oxford, UK}, title={Isotope-Ratio Techniques in Glass Studies}, url={http://doi.wiley.com/10.1002/9781118314234.ch10}, DOI={10.1002/9781118314234.ch10}, booktitle={Modern Methods for Analysing Archaeological and Historical Glass}, publisher={John Wiley & Sons Ltd}, author={Degryse, Patrick}, editor={Janssens, Koen}, year={2013}, month={Jan}, pages={235-245} }

@book{Degryse\_Henderson\_Hodgins\_2009, address={Leuven, Belgium}, title={Isotopes in vitreous materials}, volume={Studies in archaeological sciences}, url={https://www.jstor.org/stable/j.ctt9qdx40}, publisher={Leuven University Press}, author={Degryse, Patrick and Henderson, Julian and Hodgins, Gregory}, year={2009} }

@book{Demortier\_Adriaens\_European Cooperation in the Field of Scientific and Technical Research (Organization). COST G1 (Project)\_European Commission. Directorate General for Research\_2000, address={Luxembourg}, title={Ion beam study of art and archaeological

objects}, volume={EUR}, publisher={Office for Official Publications of the European Communities}, author={Demortier, G. and Adriaens, A. and European Cooperation in the Field of Scientific and Technical Research (Organization). COST G1 (Project) and European Commission. Directorate General for Research}, year={2000} }

@book{Derrick\_Stulik\_Landry\_1999, address={Los Angeles}, title={Infrared Spectroscopy in Conservation Science - infrared spectroscopy}, url={http://www.getty.edu/publications/virtuallibrary/0892364696.html}, publisher={Getty Conservation Institute}, author={Derrick, Michele R. and Stulik, Dusan C. and Landry, James M.}, year={1999} }

@article{Dran\_Salomon\_Calligaro\_Walter\_2004, title={Ion beam analysis of art works: 14 years of use in the Louvre}, volume={219-220}, DOI={10.1016/j.nimb.2004.01.019}, journal={Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms}, author={Dran, Jean-Claude and Salomon, Joseph and Calligaro, Thomas and Walter, Philippe}, year={2004}, month={Jun}, pages={7-15} }

@book{Drennan\_2009, address={New York}, edition={2nd ed}, title={Statistics for archaeologists: a commonsense approach}, volume={Interdisciplinary contributions to archaeology}, url={http://dx.doi.org/10.1007/978-1-4419-0413-3}, publisher={Springer}, author={Drennan, Robert D.}, year={2009} }

@article{Dungworth\_Girbal\_2011, title={Walmer Castle, Deal, Kent: Analysis of Window Glass}, volume={2011}, url={http://archaeologydataservice.ac.uk/archives/view/greylit/details.cfm?id=11363}, number={2}, journal={English Heritage Research Department Report Series}, author={Dungworth, D and Girbal, B}, year={2011} }

@article{Dussubieux\_Walder\_2015, title={Identifying American native and European smelted coppers with pXRF: a case study of artifacts from the Upper Great Lakes region}, volume={59}, DOI={10.1016/j.jas.2015.04.011}, journal={Journal of Archaeological Science}, author={Dussubieux, Laure and Walder, Heather}, year={2015}, month={Jul}, pages={169-178} }

@book{Edwards\_Chalmers\_Royal Society of Chemistry\_Great Britain\_2005, address={Cambridge}, title={Raman spectroscopy in archaeology and art history}, volume={RSC analytical spectroscopy monographs}, publisher={Royal Society of Chemistry}, author={Edwards, Howell G. M. and Chalmers, John M. and Royal Society of Chemistry (Great Britain)}, year={2005} }

@article{Eiland\_Williams\_2001, title={Investigation of Islamic ceramics from Tell Tuneinir using X-ray diffraction}, volume={16}, DOI={10.1002/gea.1025}, number={8}, journal={Geoarchaeology}, author={Eiland, M.L. and Williams, Q.}, year={2001}, pages={875-903} }

@article{Eliyahu-Behar\_Shilstein\_Raban-Gerstel\_Goren\_Gilboa\_Sharon\_Weiner\_2008, title={An integrated approach to reconstructing primary activities from pit deposits: iron smithing and other activities at Tel Dor under Neo-Assyrian domination}, volume={35}, DOI={10.1016/j.jas.2008.06.004}, number={11}, journal={Journal of Archaeological Science}, author={Eliyahu-Behar, Adi and Shilstein, Sana and Raban-Gerstel, Noa and

Goren, Yuval and Gilboa, Ayelet and Sharon, Ilan and Weiner, Steve}, year={2008}, month={Nov}, pages={2895-2908} }

@book{Fletcher\_Lock\_1991, address={Oxford}, title={Digging numbers: elementary statistics for archaeologists}, volume={ Monograph / Oxford University Committee for Archaeology}, publisher={Oxford University Committee for Archaeology}, author={Fletcher, Mike and Lock, G. R.}, year={1991} }

@article{Forster\_Grave\_Vickery\_Kealhofer\_2011, title={Non-destructive analysis using PXRF: methodology and application to archaeological ceramics}, volume={40}, DOI={10.1002/xrs.1360}, number={5}, journal={X-Ray Spectrometry}, author={Forster, Nicola and Grave, Peter and Vickery, Nancy and Kealhofer, Lisa}, year={2011}, month={Sep}, pages={389-398} }

@article{Frahm\_2013a, title={Silo science and portable XRF in archaeology: a response to Speakman and Shackley}, volume={40}, DOI={10.1016/j.jas.2012.09.033}, number={2}, journal={Journal of Archaeological Science}, author={Frahm, E.}, year={2013}, month={Feb}, pages={1435-1443} }

@article{Frahm\_2013b, title={Validity of 'off-the-shelf' handheld portable XRF for sourcing Near Eastern obsidian chip debris}, volume={40}, DOI={10.1016/j.jas.2012.06.038}, number={2}, journal={Journal of Archaeological Science}, author={Frahm, Ellery}, year={2013}, month={Feb}, pages={1080-1092} }  
 @article{Frahm\_2013c, title={Is obsidian sourcing about geochemistry or archaeology? A reply to Speakman and Shackley}, volume={40}, DOI={10.1016/j.jas.2012.10.001}, number={2}, journal={Journal of Archaeological Science}, author={Frahm, Ellery}, year={2013}, month={Feb}, pages={1444-1448} }

@article{Frahm\_Doonan\_2013, title={The technological versus methodological revolution of portable XRF in archaeology}, volume={40}, DOI={10.1016/j.jas.2012.10.013}, number={2}, journal={Journal of Archaeological Science}, author={Frahm, Ellery and Doonan, Roger C.P.}, year={2013}, month={Feb}, pages={1425-1434} }

@article{Freestone\_Leslie\_Thirlwall\_Gorin-Rosen\_2003, title={Strontium Isotopes in the Investigation of Early Glass Production: Byzantine and Early Islamic Glass from the Near East\*}, volume={45}, DOI={10.1111/1475-4754.00094}, number={1}, journal={Archaeometry}, author={Freestone, I. C. and Leslie, K. A. and Thirlwall, M. and Gorin-Rosen, Y.}, year={2003}, month={Feb}, pages={19-32} }

@article{Freestone\_Middleton\_1987, title={Mineralogical applications of the analytical SEM in archaeology}, volume={51}, url={http://www.minersoc.org/pages/Archive-MM/Volume\_51/51-359-21.pdf}, journal={Mineralogical Magazine}, author={Freestone, I.C and Middleton, A.P}, year={1987}, pages={21-31} }

@article{Gauss\_BÃitora\_Nowaczinski\_Rassmann\_Schukraft\_2013, title={The Early Bronze Age settlement of Fidvár, Vráble (Slovakia): reconstructing prehistoric settlement patterns using portable XRF}, volume={40}, DOI={10.1016/j.jas.2013.01.029}, number={7}, journal={Journal of Archaeological Science}, author={Gauss, Roland K. and BÃitora, J. and Nowaczinski, Erich and Rassmann, Knut and Schukraft, Gerd}, year={2013}, month={Jul}, pages={2942-2960} }

@article{Giumlia-Mair\_Albertson\_Boschian\_Giachi\_Iacomussi\_Pallecchi\_Rossi\_Shugar\_Stock\_2010, title={Surface characterisation techniques in the study and conservation of art and archaeological artefacts: a review}, volume={25}, DOI={10.1179/175355510X12850784228001}, number={5}, journal={Materials Technology}, author={Giumlia-Mair, A. and Albertson, C. and Boschian, G. and Giachi, G. and Iacomussi, P. and Pallecchi, P. and Rossi, G. and Shugar, A. N. and Stock, S.}, year={2010}, month={Nov}, pages={245-261} }

@book{Goffer\_2007, address={Hoboken, N.J.}, edition={2nd ed}, title={Archaeological chemistry}, publisher={Wiley}, author={Goffer, Zvi}, year={2007} }

@article{Goren\_Mommsen\_Klinger\_2011, title={Non-destructive provenance study of cuneiform tablets using portable X-ray fluorescence (pXRF)}, volume={38}, DOI={10.1016/j.jas.2010.10.020}, number={3}, journal={Journal of Archaeological Science}, author={Goren, Yuval and Mommsen, Hans and Klinger, JÃ¶rg}, year={2011}, month={Mar}, pages={684-696} }

@article{Grave\_Attenbrow\_Sutherland\_Pogson\_Forster\_2012, title={Non-destructive pXRF of mafic stone tools}, volume={39}, DOI={10.1016/j.jas.2011.11.011}, number={6}, journal={Journal of Archaeological Science}, author={Grave, Peter and Attenbrow, Val and Sutherland, Lin and Pogson, Ross and Forster, Nicola}, year={2012}, month={Jun}, pages={1674-1686} }

@inbook{Hamilton\_2004, address={Oxford}, title={The four scales of technical analysis; or 'how to make archaeometry more useful'}, volume={BAR international series}, url={https://contentstore.cla.co.uk/secure/link?id=1dfef87-db0c-e811-80cd-005056af4099}, booktitle={Exploring the role of analytical scale in archaeological interpretation}, publisher={Archaeopress}, author={Hamilton, E.}, year={2004}, pages={45-48} }

@inbook{Hancock\_2000, address={New York}, title={Elemental analysis}, volume={Chemical analysis}, booktitle={Modern analytical methods in art and archaeology}, publisher={Wiley}, author={Hancock, R.G.V.}, year={2000}, pages={11-20} }

@article{HAUSTEIN\_GILLIS\_PERNICKA\_2010, title={TIN ISOTOPY-A NEW METHOD FOR SOLVING OLD QUESTIONS}, volume={52}, DOI={10.1111/j.1475-4754.2010.00515.x}, number={5}, journal={Archaeometry}, author={HAUSTEIN, M. and GILLIS, C. and PERNICKA, E.}, year={2010}, month={Oct}, pages={816-832} }

@inproceedings{Heginbotham\_Bezur\_Bouchard\_Davis\_Eremin\_Frantz\_Glinsman\_Hayek\_Hook\_Kantarelou\_et al.\_2010, title={An Evaluation of inter-laboratory reproducibility for quantitative XRF of historic copper Alloys}, url={http://www.getty.edu/museum/pdfs/heginbotham\_metal2010\_submitted2.pdf}, booktitle={In Metal 2010. Proceedings of the International Conference on Metal Conservation, Charleston, South Carolina, USA, October 11-15, 2010}, publisher={Clemson University}, author={Heginbotham, A and Bezur, A and Bouchard, M and Davis, J.M and Eremin, K and Frantz, J.H and Glinsman, L and Hayek, L.A and Hook, D and Kantarelou, V and McGath, A and Shugar, A and Sirois, J and S, D and Smith, R and Speakman, R.J}, editor={Mardikian, P and Chemello, C and Watters, C and Hull, P},

year={2010}, pages={178–188} }

@article{Hein\_Tsolakidou\_Iliopoulos\_Mommsen\_Buxeda\_i\_GarrigÃ3s\_Montana\_Kilikoglou\_2002, title={Standardisation of elemental analytical techniques applied to provenance studies of archaeological ceramics: an inter laboratory calibration study}, volume={127}, DOI={10.1039/b109603f}, number={4}, journal={The Analyst}, author={Hein, A. and Tsolakidou, A. and Iliopoulos, I. and Mommsen, H. and Buxeda i GarrigÃ3s, J. and Montana, G. and Kilikoglou, V.}, year={2002}, month={Apr}, pages={542–553} }

@book{Henderson\_1989, address={Oxford}, title={Scientific analysis in archaeology and its interpretation}, volume={UCLA Institute of Archaeology, archaeological research tools}, publisher={Oxford University Committee for Archaeology, Institute of Archaeology}, author={Henderson, Julian}, year={1989} }

@book{Henderson\_2000, address={London}, title={The science and archaeology of materials: an investigation of inorganic materials}, url={https://ebookcentral.proquest.com/lib/UCL/detail.action?docID=1144554&pq-origsite=primo}, publisher={Routledge}, author={Henderson, Julian}, year={2000} }

@article{Hunt\_Speakman\_2015, title={Portable XRF analysis of archaeological sediments and ceramics}, volume={53}, DOI={10.1016/j.jas.2014.11.031}, journal={Journal of Archaeological Science}, author={Hunt, Alice M.W. and Speakman, Robert J.}, year={2015}, month={Jan}, pages={626–638} }

@article{Ingo\_Balbi\_de\_Caro\_Fragalà\_Angelini\_Bultrini\_2006, title={Combined use of SEM-EDS, OM and XRD for the characterization of corrosion products grown on silver roman coins}, volume={83}, DOI={10.1007/s00339-006-3533-0}, number={4}, journal={Applied Physics A}, author={Ingo, G.M. and Balbi, S. and de Caro, T. and Fragalà, I. and Angelini, E. and Bultrini, G.}, year={2006}, pages={493–497} }

@book{Janssens\_2011, address={Chichester, West Sussex, United Kingdom}, title={Modern methods for analysing archaeological and historical glass}, url={http://dx.doi.org/10.1002/9781118314234}, publisher={John Wiley & Sons Inc}, author={Janssens, Koen H. A.}, year={2011} }

@book{Janssens\_Grieken\_2004, address={Amsterdam, London}, title={Non-destructive microanalysis of cultural heritage materials}, volume={Comprehensive analytical chemistry}, publisher={Elsevier}, author={Janssens, Koen H. A. and Grieken, R. van}, year={2004} }

@article{Jones\_2004, title={Archaeometry and materiality: materials-based analysis in theory and practice\*}, volume={46}, DOI={10.1111/j.1475-4754.2004.00161.x}, number={3}, journal={Archaeometry}, author={Jones, A.}, year={2004}, pages={327–338} }

@book{Jones\_2001, address={Cambridge}, title={Archaeological theory and scientific practice}, volume={Topics in contemporary archaeology}, DOI={https://doi.org/10.1017/CBO9780511606069}, publisher={Cambridge University Press}, author={Jones, Andrew}, year={2001} }

@article{Kearns\_Martinón-Torres\_Rehren\_2010, address={Sheffield}, title={Metal to mould: alloy identification in experimental casting moulds using XRF}, volume={44}, number={1}, journal={Historical metallurgy: journal of the Historical Metallurgy Society}, publisher={Historical Metallurgy Society}, author={Kearns, T and Martinón-Torres, M and Rehren, Th}, year={2010}, pages={48-58} }

@article{Killick\_1997, title={Archaeology and archaeometry: From casual dating to a meaningful relationship?}, volume={71}, url={http://search.proquest.com/docview/217552149?accountid=14511}, number={273}, journal={Antiquity}, publisher={Antiquity Publications, Ltd.}, author={Killick, David}, year={1997}, pages={518-524} }

@article{Killick\_2015, title={The awkward adolescence of archaeological science}, volume={56}, DOI={10.1016/j.jas.2015.01.010}, journal={Journal of Archaeological Science}, author={Killick, David}, year={2015}, month={Apr}, pages={242-247} }

@article{Kovacs\_Schlosser\_Staub\_Schmiderer\_Pernicka\_Günther\_2009, title={Characterization of calibration materials for trace element analysis and fingerprint studies of gold using LA-ICP-MS}, volume={24}, DOI={10.1039/b819685k}, number={4}, journal={Journal of Analytical Atomic Spectrometry}, author={Kovacs, Robert and Schlosser, Sandra and Staub, Samuel Philipp and Schmiderer, Alexander and Pernicka, Ernst and Günther, Detlef}, year={2009} }

@book{Lambert\_1997, address={Reading, Mass}, title={Traces of the past: unravelling the secrets of archaeology through chemistry}, volume={Helix books}, publisher={Addison-Wesley}, author={Lambert, Joseph B.}, year={1997} }

@article{LEE-THORP\_2008, title={ON ISOTOPES AND OLD BONES\*}, volume={50}, DOI={10.1111/j.1475-4754.2008.00441.x}, number={6}, journal={Archaeometry}, author={LEE-THORP, J. A.}, year={2008}, month={Dec}, pages={925-950} }

@article{Liu\_Li\_Gan\_Zhang\_Lankton\_2012, title={Silk Road glass in Xinjiang, China: chemical compositional analysis and interpretation using a high-resolution portable XRF spectrometer}, volume={39}, DOI={10.1016/j.jas.2012.02.035}, number={7}, journal={Journal of Archaeological Science}, author={Liu, S. and Li, Q.H. and Gan, F. and Zhang, P. and Lankton, J.W.}, year={2012}, month={Jul}, pages={2128-2142} }

@book{Martini\_Milazzo\_Piacentini\_Società italiana di fisica\_International School of Physics 'Enrico Fermi'\_2004, address={Amsterdam}, title={Physics methods in archaeometry}, volume={Proceedings of the International School of Physics 'Enrico Fermi'}, publisher={IOS Press}, author={Martini, Marco and Milazzo, Mario and Piacentini, Marcello and Società italiana di fisica and International School of Physics 'Enrico Fermi'}, year={2004} }

@inbook{Martinón-Torres\_2008, address={Walnut Creek, CA}, title={Why should archaeologists take history and science seriously?}, volume={Publications of the Institute of Archaeology, University College London}, url={http://ls-tlss.ucl.ac.uk/course-materials/ARCLG107\_45457.pdf}, booktitle={Archaeology, history and science: integrating approaches to ancient materials}, publisher={Left Coast Press}, author={Martinón-Torres, M.}, year={2008}, pages={15-36} }

@inbook{ Martinón-Torres\_Killic\_2015, title={Archaeological Theories and Archaeological Sciences}, url={http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199567942.001.0001/oxfordhb-9780199567942-e-004?rskey=F3hTAd&result=1}, booktitle={The Oxford Handbook of Archaeological Theory}, author={Martinón-Torres, M and Killic, D.C}, editor={Gardner, Andrew and Lake, Mark and Sommer, Ulrike}, year={2015}, month={Feb} }

@article{ Martinón-Torres\_Li\_Bevan\_Xia\_Zhao\_Rehren\_2014, title={Forty Thousand Arms for a Single Emperor: From Chemical Data to the Labor Organization Behind the Bronze Arrows of the Terracotta Army}, volume={21}, DOI={10.1007/s10816-012-9158-z}, number={3}, journal={Journal of Archaeological Method and Theory}, author={Martinón-Torres, Marcos and Li, Xizhen Janice and Bevan, Andrew and Xia, Yin and Zhao, Kun and Rehren, Thilo}, year={2014}, month={Sep}, pages={534-562} }

@book{ Martinón-Torres\_Rehren\_2008, address={Walnut Creek, CA}, title={Archaeology, history and science: integrating approaches to ancient materials}, volume={Publications of the Institute of Archaeology, University College London}, publisher={Left Coast Press}, author={Martinón-Torres, Marcos and Rehren, Thilo}, year={2008} }

@article{ Martinón-Torres\_Uribé-Villegas\_2015a, title={The prehistoric individual, connoisseurship and archaeological science: The Muisca goldwork of Colombia}, volume={63}, DOI={10.1016/j.jas.2015.08.014}, journal={Journal of Archaeological Science}, author={Martinón-Torres, Marcos and Uribe-Villegas, María Alicia}, year={2015}, month={Nov}, pages={136-155} }

@article{ Martinón-Torres\_Uribé-Villegas\_2015b, title={The prehistoric individual, connoisseurship and archaeological science: The Muisca goldwork of Colombia}, volume={63}, DOI={10.1016/j.jas.2015.08.014}, journal={Journal of Archaeological Science}, author={Martinón-Torres, Marcos and Uribe-Villegas, María Alicia}, year={2015}, month={Nov}, pages={136-155} }

@article{ Martinón-Torres\_ValcÁircel\_Rojas\_SÁienz\_Samper\_Guerra\_2012, title={Metallic encounters in Cuba: The technology, exchange and meaning of metals before and after Columbus}, volume={31}, DOI={10.1016/j.jaa.2012.03.006}, number={4}, journal={Journal of Anthropological Archaeology}, author={Martinón-Torres, Marcos and ValcÁircel Rojas, Roberto and SÁienz Samper, Juanita and Guerra, MarÃ-a Filomena}, year={2012}, month={Dec}, pages={439-454} }

@article{ Milić\_2014, title={PXRF characterisation of obsidian from central Anatolia, the Aegean and central Europe}, volume={41}, DOI={10.1016/j.jas.2013.08.002}, journal={Journal of Archaeological Science}, author={Milić, Marina}, year={2014}, month={Jan}, pages={285-296} }

@book{ Moreau\_2009, address={Québec}, title={Proceedings: ISA 2006 : 36th International Symposium on Archaeometry : 2-6 May 2006, Quebec City, Canada}, volume={Cahiers d'archéologie du CELAT. Série archéométrie}, publisher={CELAT, Université Laval}, author={Moreau, Jean-François}, year={2009} }

@article{ Nazaroff\_Prufer\_Drake\_2010, title={Assessing the applicability of portable X-ray fluorescence spectrometry for obsidian provenance research in the Maya lowlands},

volume={37}, DOI={10.1016/j.jas.2009.11.019}, number={4}, journal={Journal of Archaeological Science}, author={Nazaroff, Adam J. and Prufer, Keith M. and Drake, Brandon L.}, year={2010}, month={Apr}, pages={885-895} }

@book{Nesse\_2004, address={New York}, edition={3rd ed}, title={Introduction to optical mineralogy}, publisher={Oxford University Press}, author={Nesse, William D.}, year={2004} }

@inproceedings{Nicholas\_Manti\_15AD, title={Testing the applicability of handheld portable XRF to the characterisation of archaeological copper alloys}, url={http://orca.cf.ac.uk/65469/}, booktitle={ICOM-CC 17th Triennial Conference Preprints, Melbourne}, publisher={Paris: International Council of Museums}, author={Nicholas, M and Manti, P}, editor={Bridgland, J}, year={15AD} }

@article{Ogburn\_Sillar\_Sierra\_2013, title={Evaluating effects of chemical weathering and surface contamination on the in situ provenance analysis of building stones in the Cuzco region of Peru with portable XRF}, volume={40}, DOI={10.1016/j.jas.2012.09.023}, number={4}, journal={Journal of Archaeological Science}, author={Ogburn, Dennis and Sillar, Bill and Sierra, Julio CÃ©sar}, year={2013}, month={Apr}, pages={1823-1837} }

@book{Olsen\_1988, address={Oxford}, title={Scanning electron microscopy in archaeology}, volume={BAR international series}, DOI={https://doi.org/10.30861/9780860545798}, publisher={B.A.R.}, author={Olsen, Sandra L.}, year={1988} }

@article{Orfanou\_Rehren\_2015, title={A (not so) dangerous method: pXRF vs. EPMA-WDS analyses of copper-based artefacts}, volume={7}, DOI={10.1007/s12520-014-0198-z}, number={3}, journal={Archaeological and Anthropological Sciences}, author={Orfanou, V. and Rehren, Th.}, year={2015}, month={Sep}, pages={387-397} }

@book{Orton, Clive\_1980, address={London}, title={Mathematics in archaeology}, volume={Collins archaeology}, publisher={Collins}, author={Orton, Clive}, year={1980} }

@book{Orton\_2000, address={Cambridge}, title={Sampling in archaeology}, volume={Cambridge manuals in archaeology}, DOI={10.1017/CBO9781139163996}, publisher={Cambridge University Press}, author={Orton, Clive}, year={2000} }

@book{Parkes\_1986, address={London}, title={Current scientific techniques in archaeology}, publisher={Croom Helm}, author={Parkes, P. A.}, year={1986} }

@book{Pollard\_Batt\_Young\_Stern\_2007, address={Cambridge}, title={Analytical chemistry in archaeology}, publisher={Cambridge University Press}, author={Pollard, A. M. and Batt, Catherine and Young, Suzanne and Stern, Ben}, year={2007} }

@book{Pollard\_Heron\_Royal Society of Chemistry (Great Britain)\_Armitage\_2017, address={Cambridge}, title={Archaeological chemistry}, publisher={Royal Society of Chemistry}, author={Pollard, A. M. and Heron, Carl and Royal Society of Chemistry (Great Britain) and Armitage, R.A.}, year={2017} }

@article{Potts\_Williams-Thorpe\_Webb\_1997, title={The Bulk Analysis of Silicate Rocks by Portable X-Ray Fluorescence: Effect of Sample Mineralogy in Relation to the Size of the Excited Volume}, volume={21}, DOI={10.1111/j.1751-908X.1997.tb00529.x}, number={1}, journal={Geostandards and Geoanalytical Research}, author={Potts, Philip J. and Williams-Thorpe, Olwen and Webb, Peter C.}, year={1997}, month={Jun}, pages={29-41} }

@inbook{Rehren\_2001, address={Oxford}, title={Qantir-Piramesses and the organisation of the Egyptian glass industry}, url={https://contentstore.cla.co.uk/secure/link?id=eadf6446-d60c-e811-80cd-005056af499}, booktitle={The social context of technological change: Egypt and the Near East, 1650-1550 B.C. : proceedings of a conference held at St Edmund Hall, Oxford, 12-14 September 2000}, publisher={Oxbow}, author={Rehren, T.}, year={2001}, pages={223-138} }

@article{Ricciardi\_Colomban\_Tournié\_Macchiarola\_Ayed\_2009, title={A non-invasive study of Roman Age mosaic glass tesserae by means of Raman spectroscopy}, volume={36}, DOI={10.1016/j.jas.2009.07.008}, number={11}, journal={Journal of Archaeological Science}, author={Ricciardi, Paola and Colomban, Philippe and Tournié, Aurélie and Macchiarola, Michele and Ayed, Naceur}, year={2009}, pages={2551-2559} }

@article{Sand-Jensen\_2007, title={How to write consistently boring scientific literature}, volume={116}, DOI={10.1111/j.0030-1299.2007.15674.x}, number={5}, journal={Oikos}, author={Sand-Jensen, Kaj}, year={2007}, pages={723-727} }

@article{Sax\_Walsh\_Freestone\_Rankin\_Meeks\_2008, title={The origins of two purportedly pre-Columbian Mexican crystal skulls}, volume={35}, DOI={10.1016/j.jas.2008.05.007}, number={10}, journal={Journal of Archaeological Science}, author={Sax, Margaret and Walsh, Jane M. and Freestone, Ian C. and Rankin, Andrew H. and Meeks, Nigel D.}, year={2008}, month={Oct}, pages={2751-2760} }

@article{Scott\_Eekelers\_Fredericks\_Degryse\_2015, title={A methodology for qualitative archaeometallurgical fieldwork using a handheld X-ray fluorescence spectrometer}, volume={1}, DOI={10.1080/20548923.2016.1183941}, number={2}, journal={STAR: Science & Technology of Archaeological Research}, author={Scott, R.B. and Eekelers, K. and Fredericks, L. and Degryse, P.}, year={2015}, month={Dec}, pages={70-80} }

@article{Scott\_Eekelers\_Degryse\_2016, title={Quantitative Chemical Analysis of Archaeological Slag Material Using Handheld X-ray Fluorescence Spectrometry}, volume={70}, DOI={10.1177/0003702815616741}, number={1}, journal={Applied Spectroscopy}, author={Scott, Rebecca B. and Eekelers, Kim and Degryse, Patrick}, year={2016}, month={Jan}, pages={94-109} }

@article{Shackley\_2010, address={Santa Barbara}, title={Is there reliability and validity in portable X-ray fluorescence spectrometry (XRF)?}, journal={SAA archaeological record}, publisher={Society for American Archaeology}, author={Shackley, M.}, year={2010}, pages={17-20} }

@inbook{Shackley\_2011a, address={New York}, title={An introduction to X-Ray Fluorescence (XRF) analysis in archaeology}, DOI={10.1007/978-1-4419-6886-9\_2},

booktitle={X-ray fluorescence spectrometry (XRF) in geoarchaeology},  
 publisher={Springer}, author={Shackley, M.}, year={2011}, pages={7-44} }

@inbook{Shackley\_2011b, address={New York}, title={An introduction to X-Ray Fluorescence (XRF) analysis in archaeology}, DOI={10.1007/978-1-4419-6886-9\_2}, booktitle={X-ray fluorescence spectrometry (XRF) in geoarchaeology}, publisher={Springer}, author={Shackley, M.}, year={2011}, pages={7-44} }

@inbook{Shackley\_2011c, address={New York, NY}, title={An Introduction to X-Ray Fluorescence (XRF) Analysis in Archaeology}, DOI={10.1007/978-1-4419-6886-9\_2}, booktitle={X-Ray Fluorescence Spectrometry (XRF) in Geoarchaeology}, publisher={Springer New York}, author={Shackley, M. Steven}, editor={Shackley, M. Steven}, year={2011}, pages={7-44} }

@article{Shackley\_2012, title={Portable X-ray Fluorescence Spectrometry (pXRF): The Good, the Bad, and the Ugly}, volume={26}, url={http://www.archaeologysouthwest.org/pdf/pXRF\_essay\_shackley.pdf}, number={2}, journal={Archaeology Southwest Magazine}, author={Shackley, M.S.}, year={2012} }

@book{Shennan\_1997, address={Iowa City}, edition={2nd ed}, title={Quantifying archaeology}, url={https://www.jstor.org/stable/10.3366/j.ctvxcrtz3}, publisher={University of Iowa Press}, author={Shennan, Stephen}, year={1997} }

@book{Shugar\_Mass\_2012, address={Leuven}, title={Handheld XRF for art and archaeology}, volume={Studies in archaeological sciences}, url={https://www.jstor.org/stable/j.ctt9qdzfs}, publisher={Leuven University Press}, author={Shugar, Aaron N. and Mass, Jennifer L.}, year={2012} }

@inbook{Shugar\_2013, address={Washington, DC}, title={Portable X-ray Fluorescence and Archaeology: Limitations of the Instrument and Suggested Methods To Achieve Desired Results}, volume={ACS symposium series}, booktitle={Archaeological chemistry VIII}, publisher={American Chemical Society}, author={Shugar, A.N.}, editor={Armitage, Ruth Ann and Burton, James H.}, year={2013}, pages={173-189} }

@article{Sillar\_Tite\_2000, title={The challenge of 'Technological choices' for materials science approaches in archaeology}, volume={42}, DOI={10.1111/j.1475-4754.2000.tb00863.x}, number={1}, journal={Archaeometry}, author={Sillar, B. and Tite, M. S.}, year={2000}, pages={2-20} }

@article{Speakman\_Little\_Creel\_Miller\_Inanez\_2011, title={Sourcing ceramics with portable XRF spectrometers? A comparison with INAA using Mimbres pottery from the American Southwest}, volume={38}, DOI={10.1016/j.jas.2011.08.011}, number={12}, journal={Journal of Archaeological Science}, author={Speakman, Robert J. and Little, Nicole C. and Creel, Darrell and Miller, Myles R. and Inanez, Javier G.}, year={2011}, pages={3483-3496} }

@inbook{Tite\_2001, address={Chichester}, title={Overview - materials study in archaeology}, url={https://contentstore.cla.co.uk/secure/link?id=db56c214-7a15-e811-80cd-005056af4099}, booktitle={Handbook of archaeological sciences}, publisher={John Wiley}, author={Tite, M. S.}, year={2001}, pages={443-448} }

@article{Tite\_2002, title={Archaeological Collections: Invasive Sampling versus Object Integrity}, volume={13}, DOI={10.5334/pia.189}, journal={Papers from the Institute of Archaeology}, author={Tite, Michael S.}, year={2002}, month={Nov} }

@article{Torrence\_Rehren\_Martinon-Torres\_2015, title={Scoping the Future of Archaeological Science: Papers in Honour of Richard Klein}, volume={56}, url={http://www.sciencedirect.com/science/journal/03054403/56}, journal={Journal of Archaeological Science}, author={Torrence, R and Rehren, Th and Martinon-Torres, M}, year={2015} }

@article{Tubb\_2007, title={Irreconcilable Differences? Problems with Unprovenanced Antiquities}, volume={18}, DOI={10.5334/pia.294}, journal={Papers from the Institute of Archaeology}, author={Tubb, Kathryn Walker}, year={2007}, month={Nov} }

@article{Tykot\_2016, title={Using Nondestructive Portable X-ray Fluorescence Spectrometers on Stone, Ceramics, Metals, and Other Materials in Museums: Advantages and Limitations}, volume={70}, DOI={10.1177/0003702815616745}, number={1}, journal={Applied Spectroscopy}, author={Tykot, Robert H.}, year={2016}, month={Jan}, pages={42-56} }

@book{Uda\_Demortier\_Nakai\_International Symposium on X-ray Archaeometry\_2005, address={Dordrecht}, title={X-rays for archaeology}, url={https://link.springer.com/book/10.1007/1-4020-3581-0}, publisher={Springer}, author={Uda, M. and Demortier, G. and Nakai, I. and International Symposium on X-ray Archaeometry}, year={2005} }

@inbook{White\_2006, address={Malden, MA}, title={Producing the record}, url={https://contentstore.cla.co.uk/secure/link?id=0e7f700a-df0c-e811-80cd-005056af4099}, booktitle={Archaeology in practice: a student guide to archaeological analyses}, publisher={Blackwell}, author={White, P.}, year={2006}, pages={410-425} }

@article{Young\_Casadio\_Schnepp\_Pearlstein\_Almer\_Haeffner\_2010, title={Non-invasive characterization of manufacturing techniques and corrosion of ancient Chinese bronzes and a later replica using synchrotron X-ray diffraction}, volume={100}, DOI={10.1007/s00339-010-5646-8}, number={3}, journal={Applied Physics A}, author={Young, M. L. and Casadio, F. and Schnepp, S. and Pearlstein, E. and Almer, J. D. and Haeffner, D. R.}, year={2010}, pages={635-646} }

@misc{Pérez-Arantegui\_2006, title={Proceedings of the 34th International Symposium on Archaeometry}, url={http://ifc.dpz.es/publicaciones/ebooks/id/2610}, year={2006} }

@article{Archaeometry, volume={49}, url={http://onlinelibrary.wiley.com.libproxy.ucl.ac.uk/doi/10.1111/arch.2007.49.issue-2/issuetoc;jsessionid=C29BB0DA1059927413EA82D1C17CC253.d03t04}, number={2} }

@article{Archaeometry, volume={50}, url={http://onlinelibrary.wiley.com.libproxy.ucl.ac.uk/doi/10.1111/arch.2008.50.issue-6/issuetoc}, number={2} }

@article{Archaeometry, volume={50}, url={http://onlinelibrary.wiley.com.libproxy.ucl.ac.uk/doi/10.1111/arch.2008.50.issue-6/issuetoc}, number={2} }

uetoc}, number={6} }

@article{Archaeological and Anthropological Sciences., volume={1},  
url={http://link.springer.com/journal/12520/1/3/page/1}, number={3} }