

ARCLG347: Laboratory and instrumental skills in archaeological science

[View Online](#)

Abe Y and others, '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' (2009) 395 *Analytical and Bioanalytical Chemistry* 1987

Adriaens A, 'Non-Destructive Analysis and Testing of Museum Objects: An Overview of 5 Years of Research' (2005) 60 *Spectrochimica Acta Part B: Atomic Spectroscopy* 1503

Alexander Bentley R, 'Strontium Isotopes from the Earth to the Archaeological Skeleton: A Review' (2006) 13 *Journal of Archaeological Method and Theory* 135

'Archaeological and Anthropological Sciences.' 1
<<http://link.springer.com/journal/12520/1/3/page/1>>

'Archaeometry' 49
<<http://onlinelibrary.wiley.com.libproxy.ucl.ac.uk/doi/10.1111/arch.2007.49.issue-2/issuetoc;jsessionid=C29BB0DA1059927413EA82D1C17CC253.d03t04>>

'——' 50
<<http://onlinelibrary.wiley.com.libproxy.ucl.ac.uk/doi/10.1111/arch.2008.50.issue-6/issuetoc>>

'——' 50
<<http://onlinelibrary.wiley.com.libproxy.ucl.ac.uk/doi/10.1111/arch.2008.50.issue-6/issuetoc>>

Arthur M. Sackler Colloquia of the National Academy of Sciences and National Academy of Sciences (U.S.), *Scientific Examination of Art: Modern Techniques in Conservation and Analysis*: National Academy of Sciences, Washington, D.C., March 19-21, 2003 (National Academies Press 2005)

Artioli G and Angelini I, *Scientific Methods and Cultural Heritage: An Introduction to the Application of Materials Science to Archaeometry and Conservation Science* (Oxford University Press 2010) <<http://UCL.eblib.com/patron/FullRecord.aspx?p=618614>>

Baxter MJ, *Exploratory Multivariate Analysis in Archaeology* (Edinburgh University Press 1994) <<https://www.jstor.org/stable/j.ctv2sx9gfb>>

——, *Statistics in Archaeology*, vol Arnold applications of statistics (Arnold 2003)

- Baxter MJ and Buck CE, 'Data Handling and Statistical Analysis', Modern analytical methods in art and archaeology, vol Chemical analysis (Wiley 2000)
<<https://contentstore.cla.co.uk/secure/link?id=5381c5cf-6c15-e811-80cd-005056af4099>>
- BAXTER MJ and FREESTONE IC, 'LOG-RATIO COMPOSITIONAL DATA ANALYSIS IN ARCHAEOOMETRY*' (2006) 48 Archaeometry 511
- Ben-David M and Flaherty EA, 'Stable Isotopes in Mammalian Research: A Beginner's Guide' (2012) 93 Journal of Mammalogy 312
- Bowman S, Science and the Past (British Museum Press 1991)
- Brothwell DR and Pollard AM, Handbook of Archaeological Sciences (John Wiley 2001)
- , Handbook of Archaeological Sciences (John Wiley 2001)
- Chaplin TD, Clark RJH and Martín-Torres M, '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' (2010) 976 Journal of Molecular Structure 350
- Charalambous A, Kassianidou V and Papasavvas G, 'A Compositional Study of Cypriot Bronzes Dating to the Early Iron Age Using Portable X-Ray Fluorescence Spectrometry (pXRF)' (2014) 46 Journal of Archaeological Science 205
- Charlton MF, Blakelock E and Martinon-Torres M, 'Investigating the Production Provenance of Iron Artifacts with Multivariate Methods' (2012) 39 Journal of Archaeological Science 2280 <<http://discovery.ucl.ac.uk/1375923/1/1375923.pdf>>
- Chippindale C, 'Colleagues, Talking, Writing, Publishing', Handbook of archaeological methods, vol 2 (Altamira Press 2006)
<<https://contentstore.cla.co.uk/secure/link?id=d9c1e291-e30c-e811-80cd-005056af4099>>
- Ciliberto E and Spoto G, Modern Analytical Methods in Art and Archaeology, vol Chemical analysis (Wiley 2000)
- Colombo C and others, 'Non-Invasive Approach in the Study of Polychrome Terracotta Sculptures: Employment of the Portable XRF to Investigate Complex Stratigraphy' (2011) 40 X-Ray Spectrometry 273
- Contrey RM and others, 'Calibration of a Portable X-Ray Fluorescence Spectrometer in the Analysis of Archaeological Samples Using Influence Coefficients' (2014) 14 Geochemistry: Exploration, Environment, Analysis
<<http://geea.lyellcollection.org.libproxy.ucl.ac.uk/content/14/3/291.full.pdf>>
- Cotte M and others, 'Recent Applications and Current Trends in Cultural Heritage Science Using Synchrotron-Based Fourier Transform Infrared Micro-Spectroscopy' (2009) 10 Comptes Rendus Physique 590

- De Atley SP and Bishop RL, 'Toward an Integrated Interface for Archaeology and Archaeometry', *The ceramic legacy of Anna O. Shepard* (University Press of Colorado 1991)
<<https://contentstore.cla.co.uk/secure/link?id=724ac537-6915-e811-80cd-005056af4099>>
- De Benedetto GE and others, 'Infrared Spectroscopy in the Mineralogical Characterization of Ancient Pottery' (2002) 3 *Journal of Cultural Heritage* 177
- Degryse P, 'Isotope-Ratio Techniques in Glass Studies' in Koen Janssens (ed), *Modern Methods for Analysing Archaeological and Historical Glass* (John Wiley & Sons Ltd 2013)
<<http://doi.wiley.com/10.1002/9781118314234.ch10>>
- Degryse P, Henderson J and Hodgins G, *Isotopes in Vitreous Materials*, vol *Studies in archaeological sciences* (Leuven University Press 2009)
<<https://www.jstor.org/stable/j.ctt9qdx40>>
- Demortier G and others, *Ion Beam Study of Art and Archaeological Objects*, vol EUR (Office for Official Publications of the European Communities 2000)
- Derrick MR, Stulik DC and Landry JM, *Infrared Spectroscopy in Conservation Science - Infrared Spectroscopy* (Getty Conservation Institute 1999)
<<http://www.getty.edu/publications/virtuallibrary/0892364696.html>>
- Dran J-C and others, 'Ion Beam Analysis of Art Works: 14 Years of Use in the Louvre' (2004) 219-220 *Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms* 7
- Drennan RD, *Statistics for Archaeologists: A Commonsense Approach*, vol *Interdisciplinary contributions to archaeology* (2nd ed, Springer 2009)
<<http://dx.doi.org/10.1007/978-1-4419-0413-3>>
- Dungworth D and Girbal B, 'Walmer Castle, Deal, Kent: Analysis of Window Glass' (2011) 2011 *English Heritage Research Department Report Series*
<<http://archaeologydataservice.ac.uk/archives/view/greylit/details.cfm?id=11363>>
- Dussubieux L and Walder H, 'Identifying American Native and European Smelted Coppers with pXRF: A Case Study of Artifacts from the Upper Great Lakes Region' (2015) 59 *Journal of Archaeological Science* 169
- Edwards HGM, Chalmers JM, and Royal Society of Chemistry (Great Britain), *Raman Spectroscopy in Archaeology and Art History*, vol *RSC analytical spectroscopy monographs* (Royal Society of Chemistry 2005)
- Eiland ML and Williams Q, 'Investigation of Islamic Ceramics from Tell Tuneinir Using X-Ray Diffraction' (2001) 16 *Geoarchaeology* 875
- Eliyahu-Behar A and others, 'An Integrated Approach to Reconstructing Primary Activities from Pit Deposits: Iron Smithing and Other Activities at Tel Dor under Neo-Assyrian Domination' (2008) 35 *Journal of Archaeological Science* 2895

Fletcher M and Lock GR, Digging Numbers: Elementary Statistics for Archaeologists, vol Monograph / Oxford University Committee for Archaeology (Oxford University Committee for Archaeology 1991)

Forster N and others, 'Non-Destructive Analysis Using PXRF: Methodology and Application to Archaeological Ceramics' (2011) 40 X-Ray Spectrometry 389

Frahm E, 'Is Obsidian Sourcing about Geochemistry or Archaeology? A Reply to Speakman and Shackley' (2013) 40 Journal of Archaeological Science 1444

Frahm E, 'Silo Science and Portable XRF in Archaeology: A Response to Speakman and Shackley' (2013) 40 Journal of Archaeological Science 1435

Frahm E, 'Validity of "off-the-Shelf" Handheld Portable XRF for Sourcing Near Eastern Obsidian Chip Debris' (2013) 40 Journal of Archaeological Science 1080

Frahm E and Doonan RCP, 'The Technological versus Methodological Revolution of Portable XRF in Archaeology' (2013) 40 Journal of Archaeological Science 1425

Freestone IC and others, 'Strontium Isotopes in the Investigation of Early Glass Production: Byzantine and Early Islamic Glass from the Near East*' (2003) 45 Archaeometry 19

Freestone IC and Middleton AP, 'Mineralogical Applications of the Analytical SEM in Archaeology' (1987) 51 Mineralogical Magazine 21
<http://www.minersoc.org/pages/Archive-MM/Volume_51/51-359-21.pdf>

Gauss RK and others, 'The Early Bronze Age Settlement of Fidvár, Vráble (Slovakia): Reconstructing Prehistoric Settlement Patterns Using Portable XRF' (2013) 40 Journal of Archaeological Science 2942

Giumlia-Mair A and others, 'Surface Characterisation Techniques in the Study and Conservation of Art and Archaeological Artefacts: A Review' (2010) 25 Materials Technology 245

Goffer Z, Archaeological Chemistry (2nd ed, Wiley 2007)

Goren Y, Mommsen H and Klinger J, 'Non-Destructive Provenance Study of Cuneiform Tablets Using Portable X-Ray Fluorescence (pXRF)' (2011) 38 Journal of Archaeological Science 684

Grave P and others, 'Non-Destructive pXRF of Mafic Stone Tools' (2012) 39 Journal of Archaeological Science 1674

Hamilton E, 'The Four Scales of Technical Analysis; or 'how to Make Archaeometry More Useful', Exploring the role of analytical scale in archaeological interpretation, vol BAR international series (Archaeopress 2004)
<<https://contentstore.cla.co.uk/secure/link?id=1dfefd87-db0c-e811-80cd-005056af4099>>

Hancock RGV, 'Elemental Analysis', Modern analytical methods in art and archaeology, vol Chemical analysis (Wiley 2000)

- HAUSTEIN M, GILLIS C and PERNICKA E, 'TIN ISOTOPY-A NEW METHOD FOR SOLVING OLD QUESTIONS' (2010) 52 *Archaeometry* 816
- Heginbotham A and others, 'An Evaluation of Inter-Laboratory Reproducibility for Quantitative XRF of Historic Copper Alloys' in P Mardikian and others (eds), *In Metal 2010. Proceedings of the International Conference on Metal Conservation*, Charleston, South Carolina, USA, October 11-15, 2010 (Clemson University 2010)
<http://www.getty.edu/museum/pdfs/heginbotham_metal2010_submitted2.pdf>
- Hein A and others, 'Standardisation of Elemental Analytical Techniques Applied to Provenance Studies of Archaeological Ceramics: An Inter Laboratory Calibration Study' (2002) 127 *The Analyst* 542
- Henderson J, *Scientific Analysis in Archaeology and Its Interpretation*, vol UCLA Institute of Archaeology, archaeological research tools (Oxford University Committee for Archaeology, Institute of Archaeology 1989)
- , *The Science and Archaeology of Materials: An Investigation of Inorganic Materials* (Routledge 2000)
<<https://ebookcentral.proquest.com/lib/UCL/detail.action?docID=1144554&pq-origsite=primo>>
- Hunt AMW and Speakman RJ, 'Portable XRF Analysis of Archaeological Sediments and Ceramics' (2015) 53 *Journal of Archaeological Science* 626
- Ingo GM and others, 'Combined Use of SEM-EDS, OM and XRD for the Characterization of Corrosion Products Grown on Silver Roman Coins' (2006) 83 *Applied Physics A* 493
- Janssens KHA, *Modern Methods for Analysing Archaeological and Historical Glass* (John Wiley & Sons Inc 2011) <<http://dx.doi.org/10.1002/9781118314234>>
- Janssens KHA and Grieken R van, *Non-Destructive Microanalysis of Cultural Heritage Materials*, vol *Comprehensive analytical chemistry* (Elsevier 2004)
- Jones A, *Archaeological Theory and Scientific Practice*, vol *Topics in contemporary archaeology* (Cambridge University Press 2001)
- Jones A, 'Archaeometry and Materiality: Materials-Based Analysis in Theory and Practice*' (2004) 46 *Archaeometry* 327
- Kearns T, Martín-Torres M and Rehren T, 'Metal to Mould: Alloy Identification in Experimental Casting Moulds Using XRF' (2010) 44 *Historical metallurgy: journal of the Historical Metallurgy Society* 48
- Killick D, 'Archaeology and Archaeometry: From Casual Dating to a Meaningful Relationship?' (1997) 71 *Antiquity* 518
<<http://search.proquest.com/docview/217552149?accountid=14511>>
- , 'The Awkward Adolescence of Archaeological Science' (2015) 56 *Journal of Archaeological Science* 242

Kovacs R and others, 'Characterization of Calibration Materials for Trace Element Analysis and Fingerprint Studies of Gold Using LA-ICP-MS' (2009) 24 Journal of Analytical Atomic Spectrometry

Lambert JB, *Traces of the Past: Unraveling the Secrets of Archaeology through Chemistry*, vol Helix books (Addison-Wesley 1997)

LEE-THORP JA, 'ON ISOTOPES AND OLD BONES*' (2008) 50 Archaeometry 925

Liu S and others, 'Silk Road Glass in Xinjiang, China: Chemical Compositional Analysis and Interpretation Using a High-Resolution Portable XRF Spectrometer' (2012) 39 Journal of Archaeological Science 2128

Martini M and others, *Physics Methods in Archaeometry*, vol Proceedings of the International School of Physics 'Enrico Fermi' (IOS Press 2004)

Martinón-Torres M, 'Why Should Archaeologists Take History and Science Seriously?', *Archaeology, history and science: integrating approaches to ancient materials*, vol Publications of the Institute of Archaeology, University College London (Left Coast Press 2008) <http://ls-tlss.ucl.ac.uk/course-materials/ARCLG107_45457.pdf>

Martinón-Torres M and others, 'Metallic Encounters in Cuba: The Technology, Exchange and Meaning of Metals before and after Columbus' (2012) 31 Journal of Anthropological Archaeology 439

—, 'Forty Thousand Arms for a Single Emperor: From Chemical Data to the Labor Organization Behind the Bronze Arrows of the Terracotta Army' (2014) 21 Journal of Archaeological Method and Theory 534

Martinón-Torres M and Killic DC, 'Archaeological Theories and Archaeological Sciences' in Andrew Gardner, Mark Lake and Ulrike Sommer (eds), *The Oxford Handbook of Archaeological Theory* (2015)
<<http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199567942.001.0001/oxfordhb-9780199567942-e-004?rskey=F3hTAd&result=1>>

Martinón-Torres M and Rehren T, *Archaeology, History and Science: Integrating Approaches to Ancient Materials*, vol Publications of the Institute of Archaeology, University College London (Left Coast Press 2008)

Martinón-Torres M and Uribe-Villegas MA, 'The Prehistoric Individual, Connoisseurship and Archaeological Science: The Muisca Goldwork of Colombia' (2015) 63 Journal of Archaeological Science 136

—, 'The Prehistoric Individual, Connoisseurship and Archaeological Science: The Muisca Goldwork of Colombia' (2015) 63 Journal of Archaeological Science 136

Milić M, 'PXRF Characterisation of Obsidian from Central Anatolia, the Aegean and Central Europe' (2014) 41 Journal of Archaeological Science 285

Moreau J-F, *Proceedings: ISA 2006 : 36th International Symposium on Archaeometry : 2-6 May 2006, Quebec City, Canada*, vol Cahiers d'archéologie du CELAT. Série archéométrie

(CELAT, Université Laval 2009)

Nazaroff AJ, Prufer KM and Drake BL, 'Assessing the Applicability of Portable X-Ray Fluorescence Spectrometry for Obsidian Provenance Research in the Maya Lowlands' (2010) 37 Journal of Archaeological Science 885

Nesse WD, Introduction to Optical Mineralogy (3rd ed, Oxford University Press 2004)

Nicholas M and Manti P, 'Testing the Applicability of Handheld Portable XRF to the Characterisation of Archaeological Copper Alloys' in J Bridgland (ed), ICOM-CC 17th Triennial Conference Preprints, Melbourne (Paris: International Council of Museums 15AD) <<http://orca.cf.ac.uk/65469/>>

Ogburn D, Sillar B and Sierra JC, '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' (2013) 40 Journal of Archaeological Science 1823

Olsen SL, Scanning Electron Microscopy in Archaeology, vol BAR international series (BAR 1988)

Orfanou V and Rehren Th, 'A (Not so) Dangerous Method: pXRF vs. EPMA-WDS Analyses of Copper-Based Artefacts' (2015) 7 Archaeological and Anthropological Sciences 387

Orton C, Sampling in Archaeology, vol Cambridge manuals in archaeology (Cambridge University Press 2000)

Orton, Clive, Mathematics in Archaeology, vol Collins archaeology (Collins 1980)

Parkes PA, Current Scientific Techniques in Archaeology (Croom Helm 1986)

Pérez-Arantegui J (ed), 'Proceedings of the 34th International Symposium on Archaeometry' (2006) <<http://ifc.dpz.es/publicaciones/ebooks/id/2610>>

Pollard AM and others, Analytical Chemistry in Archaeology (Cambridge University Press 2007)

—, Archaeological Chemistry (Royal Society of Chemistry 2017)

Potts PJ, Williams-Thorpe O and Webb PC, 'The Bulk Analysis of Silicate Rocks by Portable X-Ray Fluorescence: Effect of Sample Mineralogy in Relation to the Size of the Excited Volume' (1997) 21 Geostandards and Geoanalytical Research 29

Rehren T, 'Qantir-Piramesses and the Organisation of the Egyptian Glass Industry', 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 (Oxbow 2001)
<<https://contentstore.cla.co.uk/secure/link?id=eadf6446-d60c-e811-80cd-005056af4099>>

Ricciardi P and others, 'A Non-Invasive Study of Roman Age Mosaic Glass Tesserae by Means of Raman Spectroscopy' (2009) 36 Journal of Archaeological Science 2551

Sand-Jensen K, 'How to Write Consistently Boring Scientific Literature' (2007) 116 *Oikos* 723

Sax M and others, 'The Origins of Two Purportedly Pre-Columbian Mexican Crystal Skulls' (2008) 35 *Journal of Archaeological Science* 2751

Scott RB and others, 'A Methodology for Qualitative Archaeometallurgical Fieldwork Using a Handheld X-Ray Fluorescence Spectrometer' (2015) 1 *STAR: Science & Technology of Archaeological Research* 70

Scott RB, Eekelers K and Degryse P, 'Quantitative Chemical Analysis of Archaeological Slag Material Using Handheld X-Ray Fluorescence Spectrometry' (2016) 70 *Applied Spectroscopy* 94

Shackley M, 'Is There Reliability and Validity in Portable X-Ray Fluorescence Spectrometry (XRF)?' [2010] *SAA archaeological record* 17

—, 'An Introduction to X-Ray Fluorescence (XRF) Analysis in Archaeology', *X-ray fluorescence spectrometry (XRF) in geoarchaeology* (Springer 2011)

—, 'An Introduction to X-Ray Fluorescence (XRF) Analysis in Archaeology', *X-ray fluorescence spectrometry (XRF) in geoarchaeology* (Springer 2011)

Shackley MS, 'An Introduction to X-Ray Fluorescence (XRF) Analysis in Archaeology' in M Steven Shackley (ed), *X-Ray Fluorescence Spectrometry (XRF) in Geoarchaeology* (Springer New York 2011)

Shackley MS, 'Portable X-Ray Fluorescence Spectrometry (pXRF): The Good, the Bad, and the Ugly' (2012) 26 *Archaeology Southwest Magazine*
<http://www.archaeologysouthwest.org/pdf/pXRF_essay_shackley.pdf>

Shennan S, *Quantifying Archaeology* (2nd ed, University of Iowa Press 1997)
<<https://www.jstor.org/stable/10.3366/j.ctvxcrzt3>>

Shugar AN, 'Portable X-Ray Fluorescence and Archaeology: Limitations of the Instrument and Suggested Methods To Achieve Desired Results' in Ruth Ann Armitage and James H Burton (eds), *Archaeological chemistry VIII*, vol ACS symposium series (American Chemical Society 2013)

Shugar AN and Mass JL, *Handheld XRF for Art and Archaeology*, vol *Studies in archaeological sciences* (Leuven University Press 2012)
<<https://www.jstor.org/stable/j.ctt9qdzfs>>

Sillar B and Tite MS, 'The Challenge of "Technological Choices" for Materials Science Approaches in Archaeology' (2000) 42 *Archaeometry* 2

Speakman RJ and others, 'Sourcing Ceramics with Portable XRF Spectrometers? A Comparison with INAA Using Mimbres Pottery from the American Southwest' (2011) 38 *Journal of Archaeological Science* 3483

Tite MS, 'Overview - Materials Study in Archaeology', *Handbook of archaeological sciences*

(John Wiley 2001)

<<https://contentstore.cla.co.uk/secure/link?id=db56c214-7a15-e811-80cd-005056af4099>>

Tite MS, 'Archaeological Collections: Invasive Sampling versus Object Integrity' (2002) 13
Papers from the Institute of Archaeology

Torrence R, Rehren T and Martinon-Torres M, 'Scoping the Future of Archaeological
Science: Papers in Honour of Richard Klein' (2015) 56 Journal of Archaeological Science
<<http://www.sciencedirect.com/science/journal/03054403/56>>

Tubb KW, 'Irreconcilable Differences? Problems with Unprovenanced Antiquities' (2007) 18
Papers from the Institute of Archaeology

Tykot RH, 'Using Nondestructive Portable X-Ray Fluorescence Spectrometers on Stone,
Ceramics, Metals, and Other Materials in Museums: Advantages and Limitations' (2016) 70
Applied Spectroscopy 42

Uda M and others, X-Rays for Archaeology (Springer 2005)
<<https://link.springer.com/book/10.1007/1-4020-3581-0>>

White P, 'Producing the Record', Archaeology in practice: a student guide to archaeological
analyses (Blackwell 2006)
<<https://contentstore.cla.co.uk/secure/link?id=0e7f700a-df0c-e811-80cd-005056af4099>>

Young ML and others, 'Non-Invasive Characterization of Manufacturing Techniques
and Corrosion of Ancient Chinese Bronzes and a Later Replica Using Synchrotron X-Ray
Diffraction' (2010) 100 Applied Physics A 635