History & Heritage of Glass Group
a special interest group of the SGT

Friday 13th September 2013
Living Glass

History &Heritage Seminar
part of the Society of Glass Technology Annual Conference
at the University of Cambridge,

Programme

8:30 Registration

Session 1 - John Parker in the Chair

9:00 Barry Clark, Sarah Cable
Lead Crystal, the beginning and the end?

9:40 Jerome Harrington (Sheffield Hallam University)
Glass making and Myth making

10:20 Michael Cable
What the Siemens Brothers did for the Glass Industry

11:00 Refreshments

Session 2: Bill Brookes in the Chair

11:20 Colin Brain
Mid 17th century improvements in glass technology

12:00 Jonathan Cooke
Time and Temperature - techniques of multiple layering in glass painting

12:40 Jonathan Cooke
Book Signing

13:00 Lunch

Session 3: Roger Penlington in the Chair

14:00 Oksana Kondratyeva
Acid Etching Technique and Stained Glass: Art versus Science

14:40 Francisca Pulido Valente, Inês Coutinho, Márcia Vilarigues
Eighteenth Century Lead glass Goblets found in Portugal

15:20 Doris Moencke et alia
Creation of a borosilicate layer upon gilding of Mycenaean vitreous relief fragments vs. weathering-induced polymerization in Classic Hellenic vitreous samples - an experimental study

16:00 End of Seminar

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Abstract

Lead Crystal, the beginning and the end?

Barry Clark, Sarah Cable

George Ravenscroft is credited with inventing lead crystal in the early 1670's; it became the material of choice for decorative glass manufacturers in Britain for the next three hundred years. The glass was very clear with a high refractive index and was also softer than earlier soda-lime glasses, meaning that it was easy to cut and polish and the surfaces would sparkle brilliantly. Glass making in Britain before this innovation was classified as 'Façon de Venise', in the Venetian style, applied decoration took the form of embellishment applied while the piece was still hot or light scraffitto engraving to the finished piece. It is difficult to blow lead crystal thinly in comparison to the low-lead cristallo of Venice

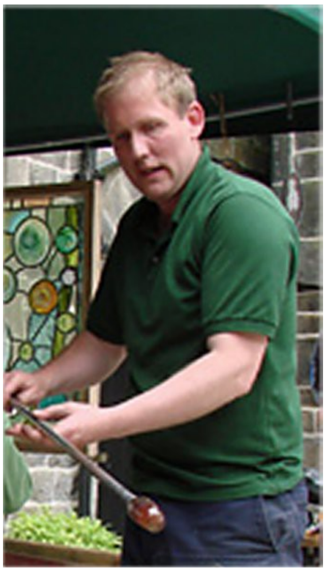
As lead crystal was adopted, the British glassmaking style began to diverge from the rest of Europe, giving our glassware a characteristic solidity and permanence and breaking free of the Venetian influence. This was a gradual process and the earliest pieces of Ravenscroft glass are recognisably façon de venise.

The twenty-first century as seen a precipitous decline in the use of full lead crystal, the cost of fuel and wages in this country together with constraints on the uses of lead- and other metal oxides and control of polishing acids.

Barry Clark and Sarah Cable are glassmakers trained in the crystal-making tradition, who have undertaken a practical study into how glass was manipulated in this period.

They have used the Ravenscroft goblet, held in the Pilkington Glass Collection, St Helens, as a key reference piece from which to evolve a body of work that re-combines façon de venise techniques with traditional British making. This paper will detail the progression of this project, with attention to some of the style elements and techniques used by Ravenscroft and his contemporaries and how these elements have been redefined for the modern age.

About the Authors:



Barry Clark has worked in glassmaking since 1993, after gaining a degree in Design History at Manchester Metropolitan University he studied and worked in Stourbridge , he has managed the national glass centre studio; run a commercial architectural glass department and worked in research, lecturing and consultancy, culminating in the establishment of his own business in 2006.

Sarah Cable has a degree 3-D Design: Glass, from the University of Wolverhampton and has worked for various glassmakers around the world, she is currently an associate lecturer in hot glass at Manchester Metropolitan University and a demonstrator for the world of glass in St Helens.

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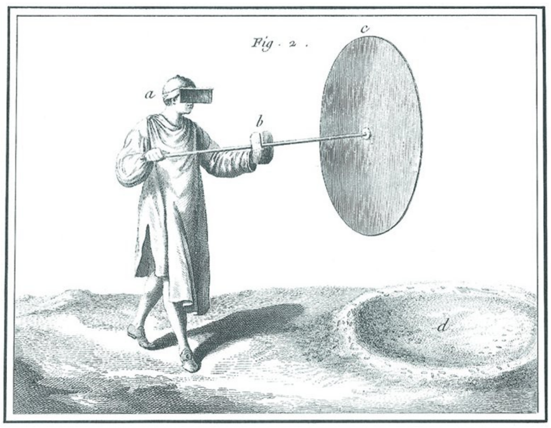
Glass making and Myth making

Jerome Harrington
Sheffield Hallam University

Jerome Harrington is an artist, with a background as a glass blower, whose work explores the inter-relation between objects and ideas. He produces short films, objects and critical writing to explore how meanings and values become interwoven with the materiality of the object.

Recent works attempt to expose a cultural perception of glass, not by working with the material itself, but by examining 'found material' - existing evidence where glass is described or depicted. This includes novels that use the word glass in their title, magic tricks in which glass is employed as a central material, and images which depict glass or glass making processes. By using found material, he aims to de-centralize his own understanding, and move to an examination of how glass is perceived by others.

In this highly visual presentation, Harrington will discuss recent research into the myth of glass flow, which despite being categorically disproved (Zanotto 1998, Brill 2012) continues to prevail and influence contemporary understandings of glass. He will trace this myth of the metamorphosis or instability of the glass object back to the production of Crown glass in the eighteenth century, discussing en route the depiction of its making process in Diderot's Encyclopedia (1751). He will subsequently explore how this myth continues to prevail in the present, examining a number of examples from popular culture where the myth becomes re-stated. A number of his recent artworks explore the interplay between the Crown glass object, the myth of glass flow and the use of glass in magic and conjuring tricks.



Within Harrington's practice, the myth of glass flow is a subject of continuing fascination because it demonstrates an interaction between a historical object and the present; between myth and knowledge, and between the physicality of material and a mental conception of it.

About the Author:

Jerome Harrington is an artist based in Sheffield, and is currently undertaking a practice based PhD in Fine art at Sheffield Hallam University. Jerome studied glass at Edinburgh College of Art (1998) and the Gerrit Rietveld Academie in Amsterdam (2004). Recent exhibitions include: A Conference for The Glass Archive, Site Gallery, Sheffield (2007); Making fact Making fiction, National Glass Centre, Sunderland (2008); and, An object described by fragments, SIA Gallery, Sheffield (2012).

www.jeromeharrington.net

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What the Siemens Brothers did for the Glass Industry

Michael Cable

By the middle of the nineteenth century glass makers were aware that progress would be greatly advanced if three problems could be solved. The first was to decrease the vast amounts of heat squandered by sending very hot combustion gases straight up a chimney and into the atmosphere. The second was to find more efficient ways of burning their solid fuels. The third was to operate continuously thus avoiding waste of time and resources in "warming up" or "standing off" before good ware could be produced.

The first improvement was to use regenerative furnaces for melting glass as had been suggested by R. Stirling in 1816 but he did not pursue his suggestion and it was then forgotten until Friedrich Siemens had the same idea in 1856 and brought it to success in 1860. The second was to gasify solid fuels by partial combustion in a gas producer. Several pioneers developed suitable apparatus and a simple but effective gas producer was invented by William Siemens. The third problem was solved by cooperation between Hans Siemens and his brother Friedrich who made the first effective tank furnace in Dresden in 1867.

Friedrich then continued his career in the glass industry making further notable advances in furnace design and in thermal toughening of glass.

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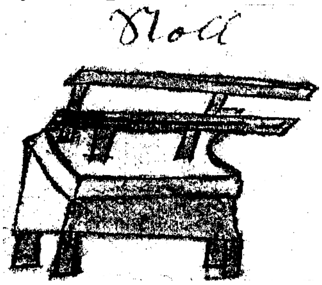
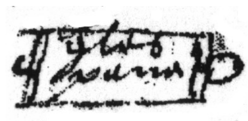
Mid 17th century improvements in glass technology:
Within these twenty years last past much improved themselves?

Colin Brain
Private researcher,
cbrain@interalpha.co.uk

"Lastly, I doubt not but our workmen in this Art will be much advantaged by this publication, who have within these twenty years last past much improved themselves (to their own great reputation, and the credit of our nation) ..."
Christopher Merret, To the Ingenious Reader in The Art of Glass, 1661.



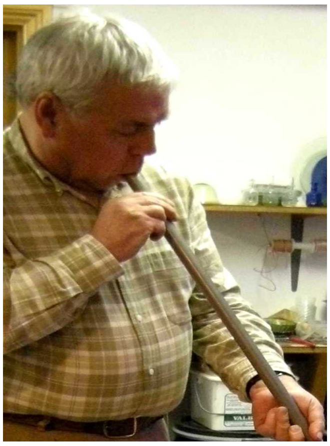
What did Merret mean when he wrote this? Who had improved what, where, how and why? The established glass literature does not help us with any of these questions, since authors have variously: forgotten, ignored, avoided, or contradicted his assertion.



This paper discusses surviving documentary and archaeological evidence for the improvements in glass technology that took place just before and after the Restoration. This evidence centres on a 'white' glass house in the Minories in the emerging east-end of London and the Rackett family of glassmakers from Altare in Italy. The paper goes on to argue that together many seemingly-small evolutionary changes (such as the chair and the iron leer pan illustrated in Gustav Jung's notebook in 1667 and shown above) had a revolutionary impact on British glass-making arts.

The paper concludes that these changes laid the foundation for the enduring and profitable industry that soon became the envy of Europe.

About the Author:



Colin Brain, with wife Sue, has been interested in the history of British drinking glass for 45 years. His particular interest is in the glass of the second half of the 17th century and he has made numerous presentations and contributions to publications on related topics. The picture shows an experiment with a blow pipe that replicates a musket barrel in order to produce moils/collets to compare with archaeological finds.

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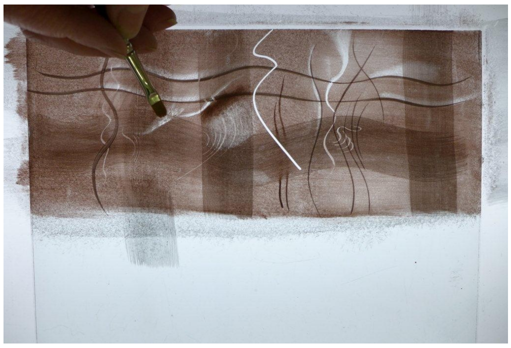
Time and Temperature - techniques of multiple layering in glass painting,
Jonathan Cooke

Glass painting is the art and craft of manipulating and thus modifying light transmitted through glass. In common with many glass painters of my generation, I was taught to paint on glass by applying a single layer of paint, and then firing, repeating for second and third layers. I began to find this approach very limiting, both in my own creative work, and when I later came to earn my living by replicating the work of previous generations, who clearly did not paint in this way. Of course, our predecessors had access to materials now either unavailable or banned as dangerous, and we must work with the materials commercially available to us today, and work safely, but it is obvious that our ancestors worked the paint on the glass in different and various ways.

Years of studying painted glass of all periods at close quarters, careful reading of the many written sources I was led to or came upon by chance, the help and encouragement of those friends with a more scientific understanding of chemical processes, and continuing experimentation with different materials, often with unexpected results, have allowed me to develop various ways of painting on glass which have expanded my repertoire.

For the creative artist, the possibility of manipulating paint both by working with multiple layers and with multiple firings is liberating. In my own practice, I have found the need to manipulate paint both wet and dry for the maximum time possible, and I have developed techniques which enable me to do this.

My explorations have been driven by the demands of restoration glass painting projects, and personal artistic expression. For me, working without unfired paint layering would hamper restoration work and would restrict the creative process. Windows of great artistic merit have been realised by the multiple firing method, and there are several good manuals in print describing this process: I am here attempting to give an alternative approach for those who have found and may find my methods useful and of interest.



Reference:
Time and Temperature: a glass painter's guide to multiple layering
ISBN 978-09548757-87, 94 pp, 18 photographs, 148 x 105 mm
Price £19.50 to include postage and packing

About the Author:

Jonathan Cooke has been fascinated by the play of light through glass as long as he can remember. As a child, he spent hours contemplating the east window in his local church and wondering how it had been created. Yorkshire born, he served a traditional apprenticeship at York Minster, and became increasingly interested in glass painting.

Starting his own business in 1987, he began to research, explore and experiment with traditional painting techniques which now inform his restoration glass painting and original work alike.

He runs highly acclaimed stained glass courses and is recognised as an inspirational teacher. Jonathan has been working for decades to understand the techniques used by stained glass artists both in the mediaeval period but also in the Victorian period. This is a necessary discipline if credible restoration of historic glazing is to be achieved.

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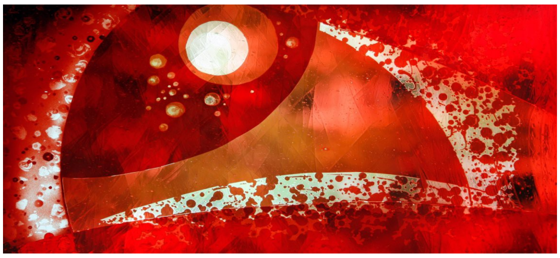
Acid Etching Technique and Stained Glass: Art vs. Science

Oksana Kondratyeva
Artist,
Studio 3, 2 Wadsworth Road, London UB6 7JD

When technical development reaches a certain level,
science and art merge together into aesthetics
Albert Einstein

The development of stained glass art was always linked to the level of scientific knowledge. Among many methods used by the stained glass artists, one particular technique stands out: hydrofluoric acid etching. The technology of the acid etching application to the flashed glass was formed over centuries and reached maturity when the hydrofluoric acid was discovered by the Swedish chemist Carl Scheele in 1771. The hydrofluoric acid decomposes the molecules of silica dioxide that allows a stained glass artist to achieve smooth colour transition by removing the layers of flashed glass by controlling the density of the acid and exposure time.

The flashed glass was invented as a response to the fact that the coloured glass produced using traditional methods was often too opaque. Red glass made of copper presented particular problem. Therefore, it had to be flashed – a bubble of clear glass was blown first, and then it was dipped into a crucible of red. By removing the layer of coloured glass it is possible to have two colours (e.g., red and white) on a single piece of glass. The white section can then be partially or fully coloured yellow by applying silver staining technique.



The author traces the history of acid etching technique to the early medieval time when the first abrasive methods were applied. Abrading in Middle Ages revolutionized design of stained glass windows and led to its frequent application predominately in heraldic stained glass windows. The author shows earliest examples of abrading applied onto flashed glass.

Fast forward to the 20th century and we see how the leading Art Nouveau artists started to apply acid etching technique to the 3D objects: sculptures, vases, lamps whose designs followed the shapes and forms found in flora and fauna. The famous School of Nancy and Èmile Gallè in particular are, probably, the brightest representatives of this art movement.

In conclusion the author discusses the practical problems of the hydrofluoric acid usage that stained glass artists face nowadays and shows richly illustrated examples of contemporary applications of acid etching onto flashed glass in ecclesiastic and secular architecture.

About the Author:

Oksana Kondratyeva is a stained glass artist and painter. She studied Glass and Architecture at Central St Martins College, University of Arts London, following her career as a credit research analyst in the City. She holds MSc in Economics from the University of Bonn, Germany. Oksana has been exhibiting at numerous venues including Mall Galleries and Sacred Space Gallery in London, Museum of Books and Printing of Ukraine in Kiev. She also has a number of publications on arts and architecture. She has lived and worked in London since 2004.

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A collection of 17th – 18th century English glass goblets found in Casa dos Bicos (Lisbon, Portugal): analytical characterization and preservation

*Francisca Pulido Valente[1], Inês Coutinho [1,2], Teresa Medici [1,2], Márcia Vilarigues [*1,2]*
1 Department of Conservation and Restoration, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, Campus de Caparica, 2829-516 Caparica, Portugal
2 Research Unit VICARTE - "Vidro e Cerâmica para as Artes", Campus Caparica, 2829-516 Caparica, Portugal

During the archaeological excavations that occurred between 1981 and 1982 at Casa dos Bicos in the city of Lisbon (Portugal) several fragments of colourless glass goblets were found. From this collection a set of 48 fragmented goblets with baluster stems and different arrangements of knops, thought to be of English origin, is now under study.

The glass fragments were characterized using analytical techniques such as μ-EDXRF (micro Energy Dispersive X-Ray Fluorescence), PIXE (Particule Induced X-ray Emission), optical microscopy and Raman microscopy.

The analyzed glass was determined to have high contents of lead, between 26 and 39 wt%, and a range of silica content from 50 to 60 wt%. Regarding the glass goblets typology and the analytical results obtained it is possible to conclude that they are typical of late 17th to 18th century English production or façon d'Anglaise.

The glass objects also exhibit several corrosion degrees where one can find practically non-corroded glass, iridescence or opaque glass with brown crusts. These corrosion products are also under analysis.

The study of this collection is part of a larger project that comprehends the study and characterization of glass collections that were found in the Portuguese territory with the aim to contribute to the knowledge of the history and artistic value of the these collections in Portugal in order to improve a better preservation and appreciation of this legacy.

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Medieval glasses from north Adriatic area: local productions or Venetian importations?.

Filomena Gallo [1], Tania Chinni [2], Alessandra Marcante [1], Alberta Silvestri [3],*
Mariangela Vandini [2], Gianmario Molin [1]
1 Department of Cultural Heritage, University of Padova, Piazza Capitaniato 7, 35129 Padova (Italy)
2 Department of Cultural Heritage, University of Ravenna, Via degli Ariani 1, 48121 Ravenna (Italy)
3 Department of Geosciences, University of Padova, Via G. Gradenigo 6, 35131 Padova (Italy)

The Middle Ages represent a period of fundamental importance in the history of glass production. Indeed, after 800 AD a series of events caused a radical change in glass manufacture both in the Islamic world and in the West. In both areas, natron, the source of alkali used from the middle of the first millennium BC, was replaced by plant ash. In the West, wood ash had become the main fluxing agent, whereas in the Middle East and southern Europe, the alkali source is generally believed to be ash from marsh plants.

In Italy, and in particular in north Adriatic area, the soda ash glass is generally attributed to Venetian production, since this city was one of the most important glassmaking centre from the Middle Ages onwards. So far, many studies of Venetian archives have proven the existence of glass trade between Venice and its hinterland, but a clear distinction between Venetian production and possible local productions of the hinterland is still lacking.

In order to shed more light on this issue, an extensive study on north Adriatic glasses was carried out inside the project PRIN 2009. About 70 glasses, dating Late Middle Ages and coming from different sites located in north-east Italy (Rocca di Asolo, Padova, Aquileia, S. Severo and Rontana) have been analysed. They belong to different types (nuppenbecher, flat based beakers with blue rim, anghistera and kropfflasche bottles, gambassino beaker), all well attested in the sites of interest.

The bulk chemistry of the samples was determined by means of Electron Probe Microanalysis (EPMA) or X Ray Fluorescence (XRF). Major and minor element compositions allowed to distinguish different compositional groups, related to the use of different fluxing agents and/or different silica sources. These groups were then compared with literature data and, in particular, with the composition of coeval samples coming from Venice, in order to identify possible similarities or dissimilarities. Results indicate that some samples show a good correspondence with Venetian compositions, supporting the hypothesis of a common provenance. On the other hand,

some other samples are clearly not comparable with Venetian productions, suggesting that Venice was not the only glass supplier for the north Adriatic area. Further scientific analysis and literature search are still in progress, with the purpose of identifying these ateliers.

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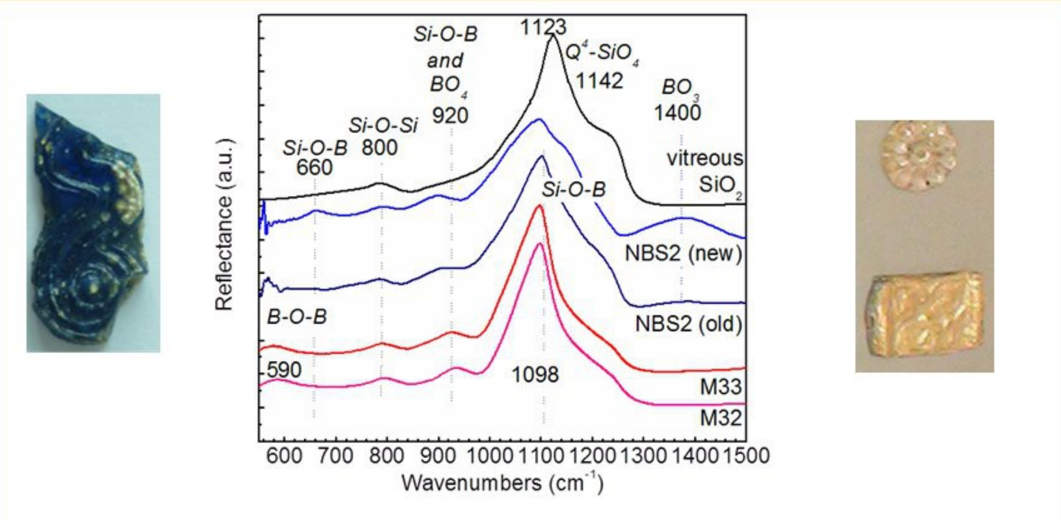
Creation of a borosilicate layer upon gilding of Mycenaean vitreous relief fragments vs. weathering-induced polymerization in Classic Hellenic vitreous samples - an experimental study

Ferdinand Drünert, Maria Kaparou, Eleni Palamara, Dimitrios Palles,
Doris Möncke, Efstratios I. Kamitsos, Nikos Zacharias

Ancient glass samples from Greece were studied in terms of their chemical composition and the structural variations induced by weathering or their surface modification, using infrared (IR) and Raman spectroscopy. The historic samples consisted of blue vitreous Mycenaean relief fragments from the Late Bronze Age as well as blue Classical Hellenic glass vessel fragments. The chemical composition of the samples is consistent with typical soda-lime-silica glasses, and the deep blue colour is caused by the absorbance of Co2+ ions in tetrahedral coordination.



Infrared spectra from the surface of Mycenaean glass fragments (red, M33 and M32) in comparison with low alkaline borosilicate glasses NBS2 (blue, comparable to laboratory glass ware) and vitreous silica (black).

In most vitreous samples vibrational spectroscopy reflects the nominal glass composition, with a predominance of Q3 groups (silicate tetrahedra with 3 bridging and 1 non-bridging oxygen atoms). On corroded surface areas silicate tetrahedra with 2 or even 3 non-bridging oxygen atoms were also identified, as a result of weathering effects. This study focuses on selected samples, in which the spectroscopic measurements on the samples surface were indicative of highly polymerized glass structures, resembling the spectra of highly polymerized silica or highly polymerized low alkaline borosilicate glasses. Measurements on cuts on the sides of the fragments show that only a very thin layer (<1 to 10 μm) on the front and back of the samples displayed such a fully polymerized glass network. Possible chemical reaction mechanisms and conditions for the formation of a silica-type layer by a sol-gel process, or of a borosilicate layer after gilding using borax as a flux were previously discussed [1]. However, this paper includes not only the results of gilding and leaching experiments on model laboratory glasses, but also further examples from archaeological vitreous findings which represent the ensuing results of both mechanisms, i.e. weathering and gilding of glassy artefacts.

[1] D. Möncke, D. Palles, N. Zacharias, M. Kaparou, E. I. Kamitsos, L. Wondraczek, Formation of an outer borosilicate glass layer on Late Bronze Age Mycenaean blue vitreous relief fragments, Phys. Chem. Glasses: B 54 (2013) 52–59.

About the Author:

Doris Möncke finished her chemistry degree at the Jena University in 1998 and has been studying structure property correlations of modern glasses since. She gained her PhD on photo-induced defect formation in 2001 at the Otto-Schott-Institute for Glass Chemistry in Jena and went 2007 as a Marie-Curie fellow to the National Hellenic Research Foundation in Athens. During her stay in Greece, she was introduced to archaeological glasses and started an on-going cooperation between NHRF and Nikos Zacharias of the University of Peloponnese. Returning to Jena in 2012 as senior researcher for modern glass studies, Doris tries to continue research on archaeological glasses with a focus on a spectroscopic approach for structural variations and the speciation of functional dopants in vitreous artefacts.