Definition of glass provides topic of discussion

In a letter to the editor of SGT published journal, *Glass Technology,* the American Society of Testing and Materials' definition of glass is called into question by Professor Adrian Wright of Reading University, possibly opening a window for debate. Meanwhile, the SGT enjoyed success at its annual bowling event and looks ahead to its approaching conferences.

Professor Adrian Wright of Reading University has questioned the American Society for Testing and Materials' (ASTM) definition of glass in a letter to the editor of *Glass Technology,* published in April. The ASTM definition for glass reads: 'An inorganic product of fusion which has cooled to a rigid condition without crystallising.'

Professor Wright continues:

If binary and multi-component glasses were indeed merely a product of fusion, i.e. of the melting together of the raw batch materials, then they would be 'frozen' liquid mixtures or 'frozen' solutions of these materials, which is clearly not the case.

The misconception that glass is prepared by melting is held by many students and glass scientists/technologists, especially those without a background in chemistry, as may be realised by their everyday technical language and the labelling of rooms such as 'Glass Melting Laboratory'. The only time when the term 'melting' can strictly be applied is when existing glass is re-melted for further working or, for example, when crystalline α-quartz is melted to produce vitreous silica.

For many oxide systems, the initial batch comprises a mixture of basic carbonates, supplying the network modifying cations and acidic glass forming oxides that provide the vitreous network. It is often mistakenly assumed that the former decompose to the oxide as the temperature increases although in reality, lithium, sodium and potassium carbonates are rather stable compounds up to the processing temperature and at the partial atmospheric pressure of carbon dioxide.

In practice, therefore, the removal of carbon dioxide from these basic carbonates results from their chemical interactions with the acidic glass-forming oxides. At the temperature of the reaction, the products are molten and, once the reaction is complete, the glass can be quenched from the resulting liquid. The formation of glass from its raw materials thus involves a chemical reaction and so glass is not simply an atomic scale mixture of the component oxides and it is a misnomer to refer to the process of glass formation from its raw materials as 'melting'.

The best definition of a glass remains in terms of its formation process. However, it is clearly necessary to amend the ASTM definition to include all glasses and not just those of one component. The author therefore suggests that the Society of Glass Technology should define glass as: 'An inorganic material that has been quenched from the liquid to a rigid state without crystallising.'

The full letter is available in the April issue of *Glass Technology* and can be provided as a PDF/Acrobat file to anyone wishing to join the debate.

The April issue of *Physics and Chemistry of Glasses* includes papers on: Photo-induced hydrogen diffusion in cobalt-doped hollow glass microspheres; XPS study of the O1s binding

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continued »

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energy of sodium borate glasses; a summary of recent studies of polyborate anions; optical nonlinearities of tellurite glasses with ultrawide Raman bands; vibrational and elastic properties of potassium borate glasses; conversion kinetics of silicate, borosilicate, and borate bioactive glasses to hydroxyapatite; a look at non-traditional molybdate glasses; ion beam synthesis of glasses; electrochemical determination of the diffusion coefficient of silver ions in soda–lime–silica glass; and anomalous diffusion of hydrogen in tungsten phosphate glasses.

Furnace Solutions 4

The SGT is organising Furnace Solutions 4 on Thursday 4th June 2009. This one-day conference focuses entirely on the practical problems in glass melting with the emphasis on sharing experiences, and proposing solutions to the challenges of today. The main theme of the meeting will be glass quality.

The conference will again be held at Ceram in Stoke-on-Trent, UK. The city is easily reached by road or rail, and both Manchester and Birmingham airports are within 90 minutes' travel time. There will be an informal reception on the evening of 3rd June for those wishing to attend.

Speakers from across the European glass and supplier industries will cover recent developments in: Furnace design; melting technology; glass furnace refractories; and pollution control.

The provisional list of titles and speakers includes: Richard Stormont of Electroglass discussing the role of electric melting and boosting technologies for glass quality improvement; Alan Stephens of Fives Stein looking at furnace design and glass quality; Richard Sims of Nikolaus Sorg examining forehearth design Conti drain and zircon cord; David Parkinson of PSR describing the development of bonded glass contact refractories for the forehearth and distributor.

In addition, Neil Simpson of Eclipse will describe float fire and the oxy forehearth; Bernard Fugier details the SEFPRO refractory solution dedicated to insulation glass furnaces; Goetz Heilemann of RHI Glas introduces a new high grade silica brick; Jiri Ullrich and Filip Janos of Glass Service look at bubble gas analysis and bubble source estimation in glass melting; and Brian Noble of GTS summarises recent research exploiting glass compositions for energy efficiency. Finally, John Osborn of Beatson Clark describes the twists and turns that have been taken in setting up carbon trading.

The registration fee is £90 per person. For further details, contact Christine Brown at the SGT.

The SGT bowling team, which claimed the 2009 title.

The Sheppee A team finished second in the annual bowling competition.

Yorkshire Section Bowling

The annual bowling evening was enjoyed by the five teams of six players who took part.

The winners were Christine's SGT team, with the Sheppee A team taking second place. The other teams were Graphoidal, Glass Training and the Sheppee B team.

SGT Annual Meeting 2009

The history and heritage special interest group annual meeting will be held at Lancaster University, UK on Friday 18th September 2009.

The provisional programme is now available to view on the meeting website. The meeting begins with a plenary lecture marking the 50th year of float glassmaking by Dr David Bricknell of Manchester Metropolitan University.

This is followed by numerous presentations including: 'One family's journey in bottlemaking' by P J Pearson; 'Glass colours at Marinha Grande by the last quarter of the 18th century' by Dr Antonio Pires de Matos; 'Conservation of glass objects: Two case studies' by Dana Norris of the Ashmolean Museum; 'What is glass?' by Prof Adrian Wright; and 'Archaeology of glass furnaces' by Ian Miller. The new MA course in stained glass conservation at York University is also described by Sarah Brown.

Further programme details can be obtained from: **www.lancaster2009.sgthome.co.uk/pages/Programme.html** ■

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