

# SGT NEWS



Compiled and published by dmj world media (uk) ltd on behalf of the Society of Glass Technology

## NEW RESEARCHERS FORUM ON GLASS

state when it cannot be approached safely? Adam is looking at the use of ultrasound on the base glass with 2%-12% simulated waste to find any measurable differences in its state and then correlated this with nuclear magnetic resonance measurements. His work has looked at room temperature glass specimens all the way up to 800°C.

Nuclear magnetic resonance has also been used to look at batch reactions in the binary  $\text{Na}_2\text{O-SiO}_2$  glass forming system.

Aled Jones of Aberystwyth University to look at the chemical environment of the silicon during the reactions between  $\text{Na}_2\text{CO}_3$  and  $\text{SiO}_2$ .

Rick Short of the University of Sheffield has been looking at molybdenum in nuclear waste glasses. This refractory metal when above 1% by weight in a glass can be insoluble and produces a yellow phase in the glass. Too much molybdenum can affect the performance of the furnace lining and can leach into water from the glass. The research has been using a standard immobilising glass with 35% waste to force out some phases and see what the issues are behind them. Molybdenum has appeared as crystallites in a scheelite crystalline phase.

The first session of the New Researchers Forum concluded with a poster session and mentoring session.

After the Keynote Address session of the Glass Opportunities

meeting, the New Researchers gathered again with Bill Brookes as chairman.

The first speaker was Panos Kanellopoulos of University of Sunderland who looked at the control of yttria stabilised zirconia (Y-TZP) during manufacture. The yttria is used to stabilise the tetragonal phase of zirconia making it tougher and durable, preventing it from assuming its more regular cubic room temperature phase.

Joanna Shaw is looking at the use of neutron diffraction in the study of nuclear waste vitrification by investigating the environment of simulants within a glass. Iron phosphate glasses have been looked at as possible storage materials for plutonium wastes.

Mehdi Mirsaneh of Sheffield University discussed the effect of  $\text{CaF}_2$  substitution for MgO in potassium fluorrichterite glass ceramics ( $\text{KNaCaMg}_5\text{Si}_8\text{O}_{22}\text{F}_2$ ). These materials have a high fracture strength and toughness but the addition of  $\text{CaF}_2$  would improve biocompatibility preventing rejection by tissue.

Harriet Foster, the 2002 Oldfield Award winner, repeated and updated her winning account of the analysis of Roman opaque glass gaming from her final year project. She determined that the gaming counters are opacified by the addition of arsenic during manufacture. ■

*President:*  
Prof Adrian Wright.

*Honorary Secretary:*  
Brian McMillan.

*Honorary Treasurer:*  
Mr R T Montgomery, CA, FSGT.



# UNDERGRADUATE PROJECT PRIZES

The UK, North American and Indian Sections of the SGT offer their own prizes for undergraduate research: The Oldfield Award in the UK; the Cooper Award in North America; and the Paul Award in India.

The awards are named after members of the Society who have been prominent in education and research. Each award carries a prize fund of £1000.

## THE OLDFIELD AWARD

The Oldfield Award offers three awards for research projects carried out by final year, undergraduate students based in the UK, as part of the requirement for their degree. The subject of the projects can be any experimental or theoretical investigation related to amorphous solids, glasses, glass-ceramics, sol-gel materials or ormocers, glass history and archaeology or glass commerce and design. This can include fundamental science, applied science, technology and engineering.

## LUCY FLORENCE OLDFIELD FSGT 1925-1989

Lucy Oldfield was born in Harrow on 18 September 1925 and educated at Harrow County School for Girls and Bedford College where she graduated with a First Class Honours Degree in Chemistry in 1947.

She worked as an analyst for British Drug Houses in Graham Street, London, for about two years and was then accepted as a post graduate research student at Imperial College, being awarded a PhD in 1952 for her research in electrochemistry.

Her first job was to try to isolate and identify the defects in TV tube components being manufactured on a Lynch press at the GEC Lemington Glassworks. Lucy's primary interest was in the structure of glass and in the relationship between composition, structure and both physical and electrical properties. It was possibly her work on borosilicate glasses that brought her international recognition and her work on glass-to-metal seals followed the long tradition of interest in this subject in the Glass and Refractories Group at Wembley.

Lucy joined the Society as a Personal Member in 1958. She was

awarded the Fellowship (No. 158) in 1965 and in 1967 was the second recipient of the London Section's Redston Award. She served on the Board of Fellows from 1970-1975, on Council from 1959-1962 and 1966-1969 and as a vice president in 1969-1972. She was chairman of the London Section in 1960-1961 and served on the Committee for twelve years and a member of the Basic Science and Technology Committee from its inception.

## THE COOPER AWARD

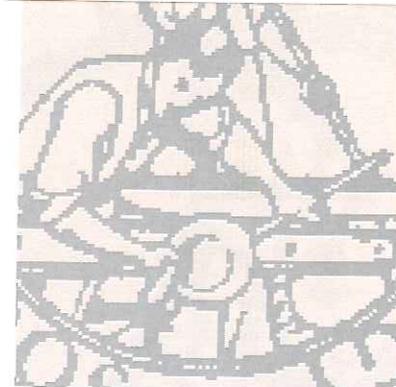
The administration of the Cooper Award is by the Executive Committee of the North American Section. Judging of the reports will be done by a panel of academics and industrialists using referees from the appropriate fields where necessary.

## PROF A R COOPER FSGT 1924-1996

Professor Alfred R Cooper's studies at Alfred University were interrupted by service in the US Navy but he returned there to graduate with a degree in Glass Technology in 1948. He then worked for RCA for several years and, following that, for Emhart. However, in 1956, his thirst for deeper understanding of glassmaking led him to begin postgraduate studies at Massachusetts Institute of Technology where he was awarded his Doctorate in 1960 for fundamental studies in refractory corrosion.

He began his academic career at MIT, where he remained until 1965, having reached the rank of associate professor. He was appointed full Professor in 1968 and spent the rest of his very distinguished career there. He officially retired as Emeritus Professor in 1992 but remained active in the Department until illness prevented him.

Al Cooper's professional achievements were largely concerned with achieving a deeper understanding of several fields important to glasses including flow in furnaces, multi-component diffusion, strength and mechanisms of strengthening, topology of random networks, structural



relaxation and the glass transition; he published more than 140 papers.

His achievements were widely recognised by numerous awards, including election to the National Academy of Engineering, distinguished Life Membership of the American Ceramic Society and Fellowship of the Society in 1982 (No. 236).

## AMALENDU PAUL FSGT 1937-1990

Amal Paul was born on 10 February 1937 in what is now Bangladesh and was educated in Calcutta. He completed his graduate and postgraduate studies in chemistry at the University of Calcutta and in 1963, was accepted by Professor Douglas to the Department of Glass Technology at Sheffield University where he was awarded an Owens Illinois Research Scholarship.

He was awarded a Senior Research Fellowship in 1966 and following his appointment to a Lectureship at the University of Sheffield in 1967 there followed a most productive decade in which he established himself as a world authority on the chemistry of glasses. In 1975 he was elected to the Fellowship of the SGT and to the Institute of Ceramics.

After his return he was actively involved in the Indian Section of the Society, taking on the task of Secretary and serving a distinguished term of office as President. He was awarded the degree of DSc by the University of Calcutta and had professional affiliations to the Royal Institute of Chemistry and the American Ceramic Society. In 1978 he was appointed to a Chair at the Materials Science Centre of the Indian Institute of Technology at Kharagpur. He was also dean of the Institute.

He was also the founding chairman of the Central Research Facility of IIT at Kharagpur.

In 1982 he collected this material, together with much else besides, in his well-known monograph *The chemistry of glasses*. Professor Amal Paul died suddenly from a heart attack at the age of 53. ■



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# SGT NEWS



## CONTRIBUTING TO SGT JOURNALS

The Society publishes the journals Glass Technology and Physics and Chemistry of Glasses that appear six times a year. Both include transactions and abstracts, Glass Technology also contains news of interest to Society Members.

Papers appearing in Glass Technology are concerned with glassmaking, glass fabrication, properties and applications of glasses or glass ceramics and other related topics.

Physics and Chemistry of Glasses accepts papers of a more scientific nature, concerned with glasses and their structure or properties.

Papers on structure of glass, for example will always appear in Physics and Chemistry of Glasses while those on furnace operation will appear in Glass Technology. In some cases, the way in which a subject is discussed determines the appropriate journal and the editors will advise authors in such cases.

Communications, which should be short original contributions in their own right with only a few illustrations, will also be considered. Comments on papers previously published in the Society's journals should be submitted as Letters to the editor.

### PREPARATION OF PAPERS

The text should be typed double spaced with wide margins on one side of the paper only. Tables, figure titles and references should be typed separately from the main text. The title and abstract should

together be as informative as possible and should avoid vague phrases such as 'An investigation of ...'. If new quantitative data are reported an attempt should be made to include them but the abstract should not exceed 200 words. The title and abstract may be widely used in information storage and retrieval systems and care in their preparation is very desirable.

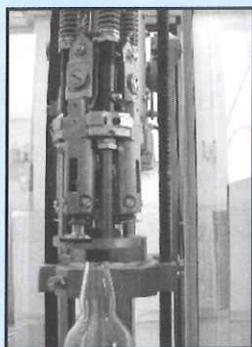
Symbols and formulae should be typewritten if possible. The use of dots, bars and similar characters over symbols, or the use of dots as multiplication signs and bars for brackets should be avoided. Suffixes and indices must be clearly indicated.

Complicated suffixes and indices should be avoided where possible.

References should be numbered where they occur in the text and a complete list of references given at the end of the paper. The Society's publications use the BSI Numeric System for references. Illustrations should be kept to a minimum. When the paper is first submitted they can be clear prints or graphs, sketches or photographs.

If the paper is accepted, authors are asked to provide the original drawings if possible and clear, glossy photographs. All diagrams should be produced to the same scale.

*Continued* ▶



### THE JUNE ISSUE OF GLASS TECHNOLOGY FEATURES PAPERS ON:

- modelling design and implementation of a servo-electric plunger mechanism for glass container forming machines (see left)
- effect of edge finish of float glass products on their strength and fatigue behaviour
- investigation of redox equilibrium of samarium in sodium borate and sodium borosilicate glasses

There are also peer reviewed papers on:

- enhancement of absorption in silicon films using a pressed glass substrate texture preparation and application of radio therapeutic glass microspheres
- a numerical simulation of the roll-on-pilfer-proof (ROPP) process on a GF305 glass container thread
- a multiple regression model of mineral wool fibre thickness on

a double-disc spinning machine

- chemical composition, thermal properties and weathering of a Roman Azur tessera from the Ninfeo of Punta Epitaffio in Baia

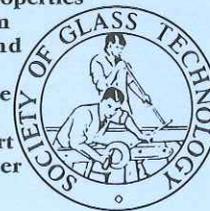
Each issue also features market sector news, a conference diary, Society news and an extensive survey of current journals in the Abstracts section.

### THE JUNE ISSUE OF PHYSICS AND CHEMISTRY OF GLASSES HAS REFEREED PAPERS ON:

- density, thermal and FTIR analysis of  $(50-x)\text{BaO} \cdot x\text{Fe}_2\text{O}_3 \cdot 50\text{P}_2\text{O}_5$  glasses
- electrical resistivity of iron phosphate melts; molecular dynamics study of zirconia containing glasses
- XPS study of lithium disilicate glass crystallisation; anomalous behaviour of ultrasonic velocity and attenuation in  $(\text{PbO})_x \cdot (\text{TeO}_2)_{1-x}$  glasses
- FTIR, EPR and x-ray investigation of mixed valence molybdenum phosphate  $\text{A}_2\text{O} \cdot (\text{MoO}_3)_2 \cdot \text{P}_2\text{O}_5$  (A=Li, Na) glasses
- water resistance of a new nonlead phosphate sealing glass additive properties in  $\text{CaO} \cdot \text{MgO} \cdot \text{Al}_2\text{O}_3 \cdot \text{SiO}_2$  glasses belonging to the diopside anorthite system
- dielectric spectroscopy of  $[(\text{Na}_2\text{B}_4\text{O}_7)_{98\%} \cdot (\text{Cr}_2\text{O}_3)_2\%]$  and  $[(\text{Na}_2\text{B}_4\text{O}_7)_{98\%} \cdot (\text{MnO})_2\%]$  semiconductor glasses

There is also the additional Abstracts section with its survey of the latest research journals, conference proceedings and books.

SGT members can choose to receive either or both journals as part of their membership. The typical rate for both journals for a member is £83. ■



### LOCAL SECTION CONTACTS

For details of forthcoming local section events in your area, contact the following. All SGT members and non-members welcome.

#### London

– Mr M Holden,  
BH-F (Engineering) Ltd,  
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– Mr R Nickels,  
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#### Yorkshire

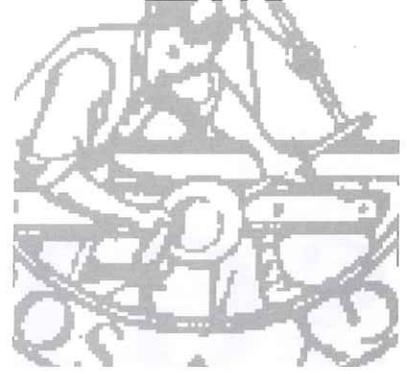
– Miss R M Sales,  
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## SUBMISSION

It is a condition of acceptance that any work submitted has not been published or considered for publication elsewhere. The only exception to this rule is that a work that has been offered to another journal and rejected on the grounds that its subject matter was inappropriate for that journal may be submitted for consideration. The author should be satisfied that no copyright is infringed and it is his responsibility to obtain permission to reproduce any material.

Three copies of the paper, communication or letter, if sent by post, should go direct to the editor of the journal which the author considers appropriate:

Dr P F Hart (EditorGT@sgt.org), Glass Technology or Professor M D Ingram (EditorPC@sgt.org), Physics and Chemistry of Glasses, Society of Glass

Technology, Don Valley House, Savile Street East, Sheffield S4 7UQ, England.

Submissions by email are welcomed, the most common formats for the initial submission are either Adobe Acrobat or Microsoft Word.

Communications and letters should be no more than two journal pages in length, approximately 2000 words of text including their equivalent in diagrams. An abstract is required for contributions submitted as a communication but not for a letter.

## REFEREEING

All papers submitted are sent to referees for their suggestions for improvement. Reports from referees are sent (anonymously) to the authors, possibly with editorial comments. The author's replies to these comments are considered before deciding to accept, reject or ask for revision of the paper. If revision is required, the final decision

will be taken after the editor has studied the revised version of the paper.

## PUBLICATION

Once a submission has been accepted it is forwarded to the managing editor who will deal with scheduling of publication and proofs, and will indicate in which issue the paper is expected to appear. The maximum time between acceptance and publication is nine months.

Authors will receive a PDF file of the final version of their paper. Authors are freely entitled to distribute or print this file. ■

# STANDARD SAMPLES

The Analysis & Properties Committee of the SGT has completed its analysis of two new certified reference materials (CRM) for amber and green coloured glasses. The standard samples were approved by the Council of the SGT in November 2000. The laboratories involved in the process have all followed ISO guidelines for the production and traceability of analytical data.

The samples are available in the form of glass pieces and 40mm dia

discs. They are intended for the verification of analytical methods, for the calibration of analytical instruments in cases where the calibration of primary substances is not possible and for establishing secondary reference materials. The solid disc is intended for establishing and checking the calibration of x-ray spectrometers for the analysis of similar materials. The 'as received' surface should be ground and polished.

The traceability of this CRM is ensured by the use of either stoichiometric analytical techniques or methods that are calibrated against pure compounds.

There are also values for  $ZrO_2$  and  $Mn_3O_4$ .

These add to the existing range of standard sand and glass samples for analysis and calibration purposes.

Magnesia-Silica Glass

**Standard Glass No. 6** Soda-Lime-Silica Glass

**Standard Glass No. 7** Soda-Lime-Silica Glass

Two lead glasses were received by the Analysis & Properties Committee but because of time limitations Glass No. 9 was not analysed by all of the collaborating laboratories. This glass has a lower lead oxide content, about 28%  $PbO$ , than Glass No. 8 and although it cannot be offered as a certified material, it could be useful as a subsidiary calibration check.

**Standard Glass No. 8** Lead oxide-potassium oxide-silica glass (30\*59 wt%  $PbO$ )

**Standard Glass No. 9** Probable composition available.

## SANDS

**Standard Sand No. 1** 200 g packs at £20.00 plus postage ( $Al_2O_3$  0.061,  $Fe_2O_3$  0.014,  $TiO_2$  0.026).

**Standard Sand No. 6** ( $Al_2O_3$  0.06,  $Fe_2O_3$  0.032,  $TiO_2$  0.024)

**Standard Sand No. 8** ( $Al_2O_3$  2.07,  $Fe_2O_3$  0.26,  $TiO_2$  0.073,  $K_2O$  1.06)

**Standard Sand No. 9** ( $Al_2O_3$  1.35,  $Fe_2O_3$  0.103,  $TiO_2$  0.044,  $K_2O$  0.82) ■

## GLASSES

**Standard Glass No. 4** Fluoride Opal Glass

Also available as 6mm thick sheets to special order, price on application.

**Standard Glass No. 5** Soda-Lime-

## INTERNATIONAL CONGRESS ON GLASS PROCEEDINGS

The full length, refereed proceedings of the Edinburgh 2001 International Congress on Glass are being prepared and will be available to purchase in a range of formats.

There will be complete printed volumes of Glass Technology and Physics and Chemistry of Glasses available for £80.00 and £100.00, respectively. They are available to members for £40.00 and £50.00, respectively. Groups of papers can also be ordered from the SGT web site, members can pay for sets of four papers for £10.00, non-members pay £10.00 for three papers. Once payment is cleared, the papers will be sent by email as Adobe Acrobat files to the customer. For further information, contact david@sgt.org or visit the Society web site: www.sgt.org

### SGT10 Amber soda-lime-silica container glass (mass%)

SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	CaO	MgO	BaO	Na <sub>2</sub> O	K <sub>2</sub> O	TiO <sub>2</sub>	SO <sub>3</sub>	Cr <sub>2</sub> O <sub>3</sub>
72.8	1.62	0.325	10.6	1.82	0.02	12.2	0.35	0.09	0.05	0.020

### SGT11 Green soda-lime-silica container glass (mass%)

SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	CaO	MgO	BaO	Na <sub>2</sub> O	K <sub>2</sub> O	TiO <sub>2</sub>	SO <sub>3</sub>	Cr <sub>2</sub> O <sub>3</sub>
70.7	1.83	0.342	10.3	2.14	0.031	13.6	0.69	0.068	0.06	0.205



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