

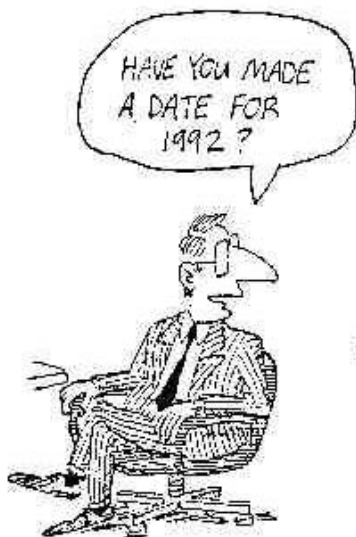
THERMAL METHODS GROUP
ANALYTICAL DIVISION
ROYAL SOCIETY OF CHEMISTRY

TMG NEWS

Editor: Dr G M Clark, Nene College, Moulton Park, Northampton NN1 7AL

NUMBER 9

1990



INTERNATIONAL CONFEDERATION
FOR THERMAL ANALYSIS

10th CONGRESS

24-28 AUGUST 1992

Hatfield Polytechnic, Hatfield, England

CHAIRMAN' S CORNER

I have just attended Laboratory '90 and there certainly seems to be some activity in the thermal analysis field, with new faces and some familiar faces appearing on the scene. It is good to see them all and to hear that they are keen to participate in the Group's activities.

It is also good to see that thermal analysis techniques are still developing and extending as shown by our meeting on the Applications of Evolved Gas Analysis. We are now into the era of TG-FTIR, TA-GC-MS, the list of initials gets longer! We were very fortunate in having Professor Phil Barnes to give an excellent overview of the area at the start of the meeting. Several of the papers from this meeting have been published in Analytical Proceedings, Vol 27, June 1990, for those who were unable to attend.

There is also a review of the Group's activities over the past four years in the August issue of this Journal. The Analytical Division likes to see that we are keeping busy! My thanks to our Honorary Secretary Cyril Keattch, for the comprehensive report which he prepared and which ensured that the AD were completely up-to-date with TMG affairs. I also want to thank our Honorary Treasurer, Dick Still, who keeps our financial affairs running so smoothly.

There are congratulations too, for two past Chairmen of the Group. John Sharp is now a Reader in the Department of Ceramics, Glasses and Polymers at Sheffield University and Ted Charsley has received a personal Chair as Head of the Thermal Analysis Consultancy Service at Leeds Polytechnic.

Congratulations and best wishes to you both.

The next two years look very good for thermal analysts, with two international conferences coming up, both in easily accessible locations. There is ESTAC 5 in August next year, with the venue located just outside Nice, for those interested in combining their improved scientific knowledge with a suntan. I am sure this will have a good attendance! Then in 1992 we are very fortunate to have 10th ICTA at Hatfield which is a great opportunity for UK thermal analysts to meet and discuss their work with scientists from all over the world.

Those new to thermal analysis are not being ignored either. We have our next Thermal Analysis School during April 22-26, 1991 for which details are already being distributed.

More immediately, we have a meeting on the Role of Thermal Analysis in Pharmaceutical Applications, which I know is going to be well attended. I would like to thank Bob Whitehouse and John Fairbrother for organising this meeting. I would also like to take this opportunity to say, that it is good to have Bob back as Vice-Chairman and thank him for his support.

Finally, my thanks to all committee members as they all put in a lot of effort and to say that I have enjoyed this first year as Chairman, and I look forward to next year and hope it is a good one for all of you.

Best wishes

Jenny Hider

... AND FROM THE HON SEC

As mentioned in the previous Report, on 15th November 1989 a meeting was held in London on “Evolved Gas Analysis”

Over 100 participants listened to a full programme of papers, all of a high standard. Some indication of the popularity was the animated of the meeting was the animated discussion during the lunch break.

On 19-20 April 1990 it was planned to hold a meeting on “Thermal Analysis of High Tc Oxide Superconductors”. The venue of Manchester University was chosen deliberately as one of the vigorous Schools pursuing this topic. However, even at a relatively late date and in spite of quite extensive advertising the numbers expressing interest did not reach double figures. The committee, therefore, had no option but to cancel the meeting. The first time this action has been taken in the 25-year history of the Group.

Several Group members are involved with the organisation of the 10th ICTA Congress. Matters are well in hand and the First Circular was distributed, world wide, in June.

In conclusion, it is a pleasure to record the customary thanks for secretarial assistance from the staff at Burlington House.

C J Keattch

DATES FOR YOUR DIARY

AGM Meeting: Applications of Thermal Methods to Pharmaceuticals

Thursday 15 November 1990

Scientific Societies Lecture Theatre, London

Speakers and Titles:

“Measurement of Free and Bound Water in Hydrogels” by J
Bouwstra (Leiden Univ)

“Differential Scanning Calorimetry and Skin Penetration Enhancers”
by Professor B Barry and A C Williams (Univ of Bradford)

“Thermotropic Transitions in Stratum Corneum Lipids” by E J
French (Univ of Bath)

“Use of Accelerating Rate Calorimetry in
Investigating the Thermal Stability of Bulk
Pharmaceutical Intermediates and Products” by
I Townsend (Smith Kline Beecham)

“Applications of Thermal Analysis Methods to Polymorphism
Studies in Pharmaceuticals” by D Girom (Sandoz AG)

“Compatibility Evaluation in Solid Dosage Form Development” by
P Timmins (Bristol Meyer Squibb)

“Investigation into the Value of Thermal Analysis in the Study of
Solid State Chemistry of Some Drug Substances” by J Waterhouse
(Glaxo)

“Physicochemical Properties of Hydrates of Aminosalicyclic Acid
Salts” by R T Forber, P York, L Sheilds, V Fawcett and R Nettleton
(Univ of Bradford)

10th Thermal Analysis School

22-26 April 1991

University of Manchester Institute of Science and Technology

This school for beginners will include the use of thermal methods in quality control and assurance. Practical sessions will occupy two days out of the four, using UMIST equipment and equipment brought on-site by manufacturers.

For further details and Circular contact Professor Frank Sale at the Department of Materials Science, UMIST.

5th European Symposium on Thermal Analysis and Calorimetry
(ESTAC 5)

26-31 August 1991

Sophia-Antipolis High-Tech Campus, Nice, France

The meeting is being organised by the Association Francaise de Calorimetrie and D'Analyse Thermique and they have chosen an excellent venue in the Technological and Scientific Community Park of Sophia-Antipolis which is approximately 15 km from Nice. Use of the Lycee International in the Park will enable a very reasonably priced accommodation package, including all meals, to be offered. Accommodation will also be available in a number of hotels situated in the Park.

Second circular to be available shortly. Potential contributors and participants contact:

Dr J Roquerol

Chairman of Organising Committee

Thermodynamics & Microcalorimetry Centre

26 rue du 14lme RIA

13003 Marseille, France

AGM Meeting: Thermal Techniques in the Investigation of Minerals
and the Evaluation of Mineral Raw Materials

17 December 1991

University of Wales College of Cardiff

Joint meeting with the Mineralogical Society Applied Mineralogy
Group.

Thermal Analysis in Education

April 1992

Date and venue to be announced.

10th ICTA International Congress

24-28 August 1992

The Hatfield Polytechnic, UK

The major world thermal analysis meeting held only every four
years. The first Circular and call for papers is now available from:

Professor D V Nowell
Division of Chemical Sciences
The Hatfield Polytechnic
College Lane
Hatfield
Herts
AL10 9AB

The Congress will comprise Plenary and Invited Lectures, Poster
Sessions and Workshops on subjects including the following main
areas:

1 Biological and biochemical materials

2 Catalysts

3 Earth sciences, cements, ceramics and glass

4 Fuels

5 Hazard evaluation and safety

6 Inorganic compounds

7 Instrumentation

8 Pharmaceutical and organic compounds

9 Polymeric materials

10 Superconductors and metallurgical systems

11 Theory

A number of awards will be presented and associated lectures given during the Congress.

An Instrument Exhibition featuring the latest thermal analysis and associated equipment will be held alongside the Congress.

In addition to the main Congress, a social programme is being organised for spouses, accompanying persons and delegates to include tours around local areas of interest. Social events will be arranged for the evenings including the Conference Dinner. An Elizabethan Banquet will be held at the Old Palace, Hatfield Park. Pre and post conference tours will also be arranged.

SAC 92: Conference on Analytical Chemistry
20-26 September 1992
University of Reading

The conference will celebrate the 150th Anniversary of The Laboratory of the Government Chemist.

The scientific programme will be organised around plenary, invited and contributed papers and posters covering the whole field of analytical chemistry including thermal analysis. The programme will include workshops, where research workers can demonstrate new apparatus and techniques. An opportunity will be made for all participants to visit The Laboratory of the Government Chemist and other scientific establishments.

For further information contact:

The Secretary
Analytical Division
Royal Society of Chemistry
Burlington House
Piccadilly
London

THERMAL METHODS GROUP AWARD

Applications are invited for the 6th TMG Award, which is available to assist a young thermal analyst to attend ESTAC 5, in Nice, France during 26-31 August 1991.

Entrants for the Award, value £350, must be under 35 years of age on 1 January 1991 and resident in the UK.

Submissions should be in the form of an essay of 2000-3000 words on any topic in thermal analysis. The Award winning essay will be presented as a paper at ESTAC 5. The closing date is 31 January 1991.

Further details are available from:

Dr Cyril Keattch
Hon Secretary
Thermal Methods Group
P0 Box 9
Lyme Regis
Dorset
DT7 3BT

Tel: (02974) 2472

THERMAL ANALYSIS CONSULTANCY SERVICE
LEEDS POLYTECHNIC
SHORT COURSES FOR 1991

As part of its successful short course programme the TACS will be hold two residential meetings in Leeds in 1991.

The first course, entitled "Thermal Analysis of Polymers", will be held on 16-17 April 1991. Topics to be covered include DSC of Physical Transitions in Polymers, Characterisation of Polymer Blends, the Role of DSC in the Modern Polymer Laboratory, Kinetic Techniques, Thermomechanical Methods and Applications of TA-MS and TA-FTIR.

The speakers will include Dr J Barton (RAE), Dr E Gimzewski (BP), Dr J Hay (Birmingham Univ), Dr N Reading (Id), Dr N Richardson (NFL), Dr S Warrington (TACS) and Mr P Willcocks (ICI).

The second course, entitled "Thermal Analysis '91", will be held on 12-13 September 1991. The first day will provide a detailed introduction to the major thermal analysis techniques and the second day will concentrate on application areas including Polymers, Pharmaceuticals, Fuels and Lubricants, Minerals, Metallurgy and Materials Science, Constant Rate Thermal Analysis Techniques and Quality Assurance in the Thermal Analysis Laboratory. The Keynote Speakers will be Prof David Dollimore (USA) and Prof Slade Warne (Australia). Other speakers will include Prof P Barnes (Leeds Polytechnic), Prof E Charsley (TACS), Dr E Gimzewski (BP), Dr P Laye (Leeds Univ), Mr I Luscombe (ICI), Dr N Reading (ICI), Dr S Warrington (TACS) and Mr P Willcocks (ICI).

Both meetings will be accompanied by an exhibition of thermal analysis equipment.

For further details please contact:

Professor Edward Charsley
Thermal Analysis Consultancy Service
Leeds Polytechnic
Calverley Street
Leeds
LS1 3HE

GROUP'S SUCCESS IN DIVISIONAL REVIEW

As part of its internal review procedures the Analytical Division has held assessments of its subject groups. The Thermal Methods Group was assessed in January 1990 when the Chairman and the Hon Secretary attended the Group Liaison and Policy Committee to present its quaterquennial report and its future plans.

The GLPC made a number of suggestions, especially with regard to possible future joint meetings, and congratulated the Group on its achievements (and its healthy bank balance!).

Congratulations to the Chairman who (according to the Editor's mole) presented the Group's Report admirably and assured our continued long-term existence.

NEWS SNIPPETS

Congratulations to John Sharp (ex Chairman, 1971- 73) who has been promoted to Reader in the Dept of Ceramics, Glasses and Polymers at Sheffield University.

Well done to Ted Charsley (ex Chairman, 1979-81) who has been awarded a personal professorship by Leeds Polytechnic. Having taken 23 years to complete his PhD and 23 months to gain a professorship, there is a strong rumour that Ted is to become President of the Royal Society in 23 weeks, and will probably replace Mrs Thatcher 23 days afterwards.

Commissions to Cyril Keatch who has been appointed as Regional Editor of Journal of Thermal Analysis. There is no truth in the rumour that Cyril's first task will be to ensure that papers submitted in 1975 will soon be published.

Richard Pryde has moved from Du Pont to PL Thermal Sciences in Loughborough.

Jezz Leckenby has returned from the USA - he moves faster than the Editor! He has formed Stormage Scientific Systems, a new supplier of TA equipment in the UK.

Trevor Lever is now a Director of Marlin Scientific Ltd. exclusive distributors for TA Instruments, whose European launch was held during the Laboratory Week Exhibition at Olympia in September 1990. TA Instruments is the company formed in the management buy-out of Du Pont's thermal analysis business.

We are delighted to hear that David Dollimore (ex Chairman, 1969-71) has recovered well from his heart attack and is back working as hard as ever at the University of Toledo, USA.

It was with great sadness that we learned of the tragic sudden death in December 1989 of Bruce Mitchell who was known and respected by everyone in thermal analysis. Bruce was one of the organisers of the 1st ICTA Congress in Aberdeen in 1965. We extend our deepest condolences to Eileen and the family.

EXILES CORNER

We have many overseas members, particularly in the USA and Europe, and a few in Asia, Africa and Australia. News from them would be most welcome. Come on, don't be shy!

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THERMAL ANALYSIS REVIEWS AND ABSTRACTS

Subscribers and readers of the new TARandA, which has replaced Thermal Analysis Abstracts, will be aware that the new desktop-published style and format in its blue livery provides a much more readable journal. Issues are also now published on time so it now provides a much better updating service of the worldwide Thermal Analysis literature. Review content is also increasing. A listing of Reviews 1--i was given in TMG News No 7 (1988) and of Reviews 8-9 in TMG News No 8 (1989). Recently published Reviews are:

No 10 "Thermoacoustic Emission Analysis" G M Clark (UK)
Volume 18, No 6 (1989)

No 11 "Applications of DSC to Questions of Biological Interest"
I Lamprecht (Germany)
Volume 19, No 1 (1990)

No 12 “Characterisation of Pharmaceutical Film Coating
Formulations by Thermal Methods”
A O Okhamafe (Nigeria)
Volume 19, No 3 (1990)

No 13 “Kinetic Analysis of Thermogravimetric Data”
R K Agrawal (USA)
Volume 19, No 4 (1990)

TARandA is published in six issues per year. Over 300 journals are regularly scanned by over 30 abstractors worldwide. Comprehensive author and keyword indexes feature in each issue.

Anyone wishing to contribute a future review article or to join the team of abstractors should contact:

Dr G M Clark
Editor TARandA
c/o Interscience Communications Ltd
24 Quentin Road
London
SE13 5DF

Annual subscriptions, £268 for Volume 20, can be obtained from the Publications Section of Interscience Communications Ltd. Back issues are also available at much reduced prices.

INSTRUMENT NEWS FROM THE MANUFACTURERS

Perkin-Elmer Thermal Analysis Systems

The PC Series is a cost effective Thermal Analysis system, which permits the DSC 7 Differential Scanning Calorimeter, the TGA 7 Thermogravimetric Analyser, the TMA 7 Thermomechanical Analyser and the DTA 1700 Differential Thermal Analyser to be controlled from a PC or PS-2 computer.

The 7 series Thermal Analysis System uses the same range of instrument modules, but is controlled by a Perkin-Elmer 7000 Series Workstation. It is designed for laboratories with high sample volumes, those running many different types of sample or where multiple TA analyzers must be run simultaneously.

The DMA 7 Dynamic Mechanical Analyzer is the latest addition to the thermal instruments range and offers newly-developed non-clamped modes of operation, together with the more traditional clamping modes. This allows analysis of very different sample types from very low to very high modulus.

Sophisticated software allows real time display of tan delta plus loss and storage modulus, with additional facilities such as frequency scanning, and stress, strain and creep measurements. The DMA 7 is compatible with the Perkin-Elmer 7 Series Thermal Analysis System, and may be operated independently or in combination with the DSC 7, the TGA 7 and the TMA 7.

The Perkin-Elmer range of thermal analysis software includes specialised programs for the DSC 7 Differential Scanning Calorimeter.

Purity software is used to determine the purity of most crystalline organic materials. The method is based on the van't Hoff law and does not require a pure standard of the material for calibration purposes. Results are quoted in mole percent purity and can be plotted together with the calorimetric data onto an A4 plotter. Total analysis time is around 20 minutes, including sample preparation.

Kinetics Software determines the cure kinetics of cross linking polymerisations, by computing the Arrhenius kinetic parameters for a reaction, which can then be used to predict isothermal and adiabatic behaviour of the sample.

The isothermal predictions include cure times! temperatures and power requirements, while adiabatic predictions can be used to predict the hazardous behaviour of a material at any storage temperature.

For further information contact:

Perkin-Elmer Limited
Maxwell Road
Beaconsfield
Bucks
HP9 1QA
(Carol-Anne Green, Tel: (0494) 676161 ext 2431)

Netzsch: Thermal Analysis Systems

Netzsch Instruments have the widest of temperature to cover all application requirements:

TG	-160°C	+ 2400°C
DTA	-160°C	+ 2400°C
DSC/Cp	-100°C	+ 1500°C
Dilatometry	-160°C	+ 2000°C
TMA	-150°C	+ 1000°C

The Netzsch Simultaneous Thermal Analysis (STA) systems combine two or more of the above techniques and can operate over the temperature range - 160⁰C -. + 2400⁰C.

All systems can be operated under vacuum, in static or dynamic atmosphere using inert, reactive or corrosive gases and have a data acquisition and computer system with software for automatic control and evaluation.

Extensions such as Mass Spectrometry for the quantitative analysis of evolved gases are available, and Netzsch have a unique software package that combines the Simultaneous TG-DSC technique and Mass Spectrometry with all control and evaluation using one computer.

New products include:

1 DSC 200 (- 170⁰C ... + 530⁰C).

2 DSC for Specific Heat measurements to 1400⁰C.

3 Simultaneous TG-DTA/DSC to 1700⁰C.

- 4 Software package combining Simultaneous TG-DSC with Mass Spectrometer.
- 5 Software packages for multitasking and Kinetics evaluation.

For further information contact:

Thermal Analysis Division
Netzsch Mastermix Ltd
Vigo Place
Aldridge
Walsall
West Midlands
WS9 8UG
Tel: (0922) 53355

Improvements to Columbia Scientific's Calorimeter range, and Thermal Hazard Sample Test Service

CSI's Accelerating Rate Calorimeter (ARC) has been subject to a major performance improvement. Calorimetric sensitivity (detection of exothermic reaction onset or activity) has been increased 200-400%. This has been made possible by a new Nisyl-Nicrosyl thermocouple system. (The ARC is the foremost quantitative hazard evaluation system. It is a highly adiabatic calorimeter simulating on the laboratory scale what may happen on the large scale. It will quantify runaway reactions, the reactions industry doesn't want to occur, getting a full time, temperature pressure profile under worst case conditions to allow a full safety assessment).

For organisations with limited testing requirements, a commercial sample test service is offered on the ARC located at Milton Keynes. In July 1990 Phillip O’Kane joined CSI, Phill’s major role is to consolidate and improve this service used widely by industry and recognised for competence, confidentiality, and speed of turnaround.

CSI’s Quantitative Reaction Calorimeter (QRC) has had some performance improvements and software enhancements. This has allowed work under increased pressure and over a wider temperature range. Vessels in new alloys are available. (The QRC is a reaction calorimeter utilising the power compensation measurement principle and constant thermal efficiency, to allow accurate and reliable determination of heat of a very wide range of reactions at high sensitivity).

Free technical information sheets and details of these calorimeters or the customer Sample Service are available. Contact:

Martyn Ottaway
Columbia Scientific Industries
101 Garmonde Drive
Wymbush
Milton Keynes
MK8 8DD
Tel: (0908 569595

SELECTED TOPICS IN THERMAL ANALYSIS

A one-day meeting on selected topics was recently held at the Gatwick Penta Hotel, Gatwick Airport on 17 October 1990 to celebrate the contributions to thermal analysis of Dr John Redfern who is retiring after 25 years in the industry. John was Chairman of the TMG from 1967-69. The programme included the following contributions:

“Temperature the Powerful Variable” by Prof Ray Wetton (PL-Thermal Sciences)

“Fundamentals of Molecular Relaxation Processes - Dielectric - Mechanical” by Prof Graham Williams (Univ of Wales)

“Effect of Physical Ageing on Polymer Properties” by Dr Jim Hay (Univ of Birmingham)

“Dynamic Mechanical Study of Morphology and Crystallinity in Polyethylene” by Dr Jacques Rault (Univ of Paris Sud)

“The Application of Thermal Analysis to Evaluation of Polymeric Packaging Materials” by Dr David Edwards (Glaxo Pharmaceuticals Ltd)

“Study of Anaerobic Adhesives using DMTA and Related Techniques” by Dr Ciaran McArdle (Loctite, Ireland)

“STA Measurements on Catalysts - Absolute Specific Heat Considerations” by Dr Peter Laye (Univ of Leeds)

“Studies of Novel Cement Systems” by Dr John Sharp (Sheffield Univ)

“Landmarks in Thermal Analysis” by Dr Cyril Keatch

In the evening a Dr Redfern and to retirement. dinner was wish him a held to honour long and happy retirement.

(The TMG adds its best wishes - Editor.)

SIMULTANEOUS THERMAL ANALYSIS SPECTROMETRY

The Thermal Analysis Leeds Polytechnic Consultancy Service (TACS) has recently concluded successful series of one day courses on simultaneous TA-MS held in conjunction with V G Quadrupoles.

Starting in Leeds in March 1990, the course was then held in Utrecht and Wiesbaden in April and in Cambridge, Massachusetts in September. The Keynote Speaker was Dr Drew McGhie of Laboratory for the Research into the Structure Matter of the University of Pennsylvania and other speakers were Mr Lindsay Holcroft and Nick Manning of V C Quadrupoles and Prof Ted Charsley and Dr Steve Warrington of the TACS.

Rumours that the lecture team were recently seen trying on hats with corks attached are as yet unfounded.

INDUSTRIAL AND RESEARCH APPLICATIONS OF THERMAL ANALYSIS

An intensive one day course, attracting over 70 delegates, was held in Leeds on 7 June 1990 by the Thermal Analysis Consultancy Service of Leeds Polytechnic.

The meeting concentrated on showing how thermal methods can be used to investigate a wide range of industrial problems. The techniques covered included, DSC, DTA, TG, Microcalorimetry, EGA, Thermomechanical Methods and Thermomicroscopy.

The meeting was chaired by Prof Phil Barnes (Leeds Polytechnic) and the other speakers were Dr Ted Charsley (TACS), Mr Peter Haines (Kingston Poly), Dr Ed Gimzewski (BP), Dr Peter Laye (Leeds Univ), Dr Mike Reading (ICI) and Dr Steve Warrington (TACS).

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Trevor Lever (see page 13) tells me that Marlin Scientific Ltd can now be contacted at their new premises:

Park House
Units 15-19 Greenhill Crescent
Watford Business Park
Watford
Herts
WD1 8QU

Tel: (0923) 55205 (sales) (0923) 55206 (service)