

Inside this issue:

Company News

Triton celebrate 10 years	1
Small Volume Humidity Conditioning System	1
identiPol system launched at "K" show	1
NEW 85/85 Humidity Chamber for Tritec2000 DMA/ PerkinElmer DMA8000	2

Feature

DETA system for studying amorphous sugar powders	4
---	---

Products and Services

Dielectric THERMAL Analyser	2
Humidity Generator and Controller	3
identiPol QA	3
Shimadzu Thermal Analysers (UK only)	4

Special offers:

Trade in for a NEW DETA	2
DSC60 Differential Scanning Calorimeter	4
DTG60 Simultaneous DTA/TGA	
TMA60 Thermo Mechanical Analyser	

Triton Technology celebrates ten years in business

To mark its tenth birthday in September 2007, Triton Technology hosted an open evening with buffet at the company's premises in Keyworth on the 18th October 2007. Invited guests were the first to see a highly novel plastics analyser system, the **identiPol QA**. All the company's other products were also on show for the visitors.

The company was first registered in 1997 with the aim of developing highly competitive and novel materials characterisation equipment. The first product, the Tritec2000 Dynamic Mechanical Analyser won the R&D 100 Award in the USA in 2001 and went on to be a world-wide success. In January 2007, this product line was sold to PerkinElmer LAS Inc to make way for the revolutionary **identiPol** system.

The **identiPol** and Triton's other products are detailed further in this Newsletter.

'K' Show Dusseldorf – October 2007

Launch of identiPol QA system

Pat.Pending (UK 0719768.4)

See page 3



NEW - Small Volume Humidity Conditioning Chamber

The Triton Technology **Humidity Generator and Controller** is a unique and flexible solution to deliver an accurate relative humidity for a variety of applications. This has now been combined with a **Stable Micro Systems Peltier Cabinet**, allowing small amounts of materials to be conditioned at a set temperature and humidity. (As shown in the picture below.)



This is a very useful procedure to pre-condition materials prior to examination or testing e.g. by thermal analysis. Materials can be exposed to defined humidity and temperature on a small scale to check stability e.g. foodstuffs, drugs etc..

The operating principle for the **Humidity Generator and Controller** is described below;

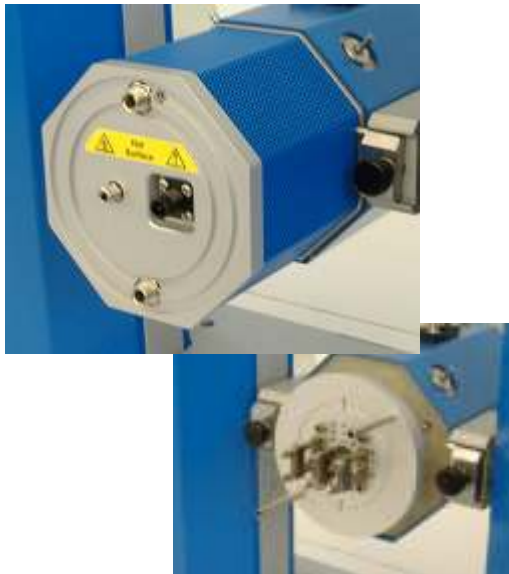
Air is pumped through a desiccant built into the Humidity Generator. A valve, controlled by a humidity sensor placed at the sample site in the Conditioning Chamber, is used to divert some gas flow through a water reservoir before being pumped through to the Chamber. This feedback function ensures that the humidity selected is the real humidity at the sample site.

The Chamber has a volume in excess of 2 litres and the temperature is accurately controlled using a Peltier system. This provides precise control of temperature from 20°C below ambient to 80°C.

With the Humidity Generator and Controller, a typical control range is up to 60°C and 80% humidity. These specifications are dictated by each other and higher humidity may be achievable with a lower temperature (or vice versa).

Note that the Peltier Cabinet is designed to fit Stable Micro Systems Texture Analyser systems and therefore the possibility now exist for testing materials such as pharmaceuticals and foodstuffs under defined relative humidity conditions.

NEW 85/85 Humidity Chamber for Triton DMA/PE DMA8000



The Triton Technology **85/85 Humidity Chamber** is a unique solution that allows accurate delivery of relative humidity up to 85°C and up to 85% humidity in a Triton DMA or a PerkinElmer DMA 8000.

This chamber utilises the Triton Humidity Generator and Controller plus a suitable re-circulator.

A simple modification to the DMA drive body cover is also available for those wishing to routinely work at maximum specification.

Features

- Thermal jacket completely surrounds sample chamber
- Easy interchange with standard Geometry Disc for standard DMA use and vice versa
- Utilises the proven feedback control of the Triton Humidity Generator and Controller unit.

Benefits

- No 'cold spots' and stable temperatures
- Highly stable humidity control
- Rapid set up
- Integral humidity sensor incorporated inside the Chamber provides accurate humidity reading around the sample simultaneously providing the feedback to control the humidity to a specified value

Specifications

Humidity Range: 5% to 95% (25°C)
10% to 85% (85°C)

Temperature Range: 5°C to 85°C

Sample chamber volume: 200 cc (Approx)

Connections: Heated humidity transfer line
Humidity sensor connection
In and out Recirculation fluid connections

Trade in for a NEW TRITON DS6000 Dielectric THERMAL Analyser !!

For a limited period, we will consider a **trade in** of any Thermal Analyser in part exchange for the all new **Triton DS6000 DETA**. The **Triton DS6000 DETA** is the most flexible and cost effective Dielectric THERMAL Analyser available today. Its innovative design, high functionality and flexible operation make the Triton DS6000 DETA ideal for advanced research or simple QC.



The DS6000 uses architecture for those familiar with Triton Technology Ltd. products. Using highly developed ovens, cooling accessories and add on environmental controls allows researchers to extend materials knowledge with this highly innovative product.

The Triton Dielectric **Thermal** Analyser (DETA) is a very powerful technique for probing both the molecular and rheological behaviour of materials. The material should possess at least one component that possesses a dipolar molecule. Most polymers are good examples of typical material but powders and various liquids such as oils and waxes can also be investigated with this technique.

The information obtained can help with the identification of structure and aid process optimisation and end user performance.

In particular, molecular relaxations, the cure of resin systems and calculation of activation energies.

The sensitivity can be so great that it can achieve far better resolution of secondary relaxations than DMA in many cases.

Industries that could benefit from the use of DETA include for example:-

- Aerospace
- Automotive
- Defence
- Energy
- Food
- Plastics
- Electronics
- Petrochemical
- Pharmaceutical

Examples of the **types** of materials that can be studied by the DETA technique are:-

- Thermoplastics
- Films
- Thermo set resins
- Paint, Paint Films and Coating
- Amorphous powders / Pharmaceuticals
- Elastomers
- Adhesives
- Food products
- Oils, Waxes and Greases
- Composites

Molecular relaxations can be easily detected in polymeric materials as long as the material possesses at least one species present that has a dipole. Polymers without an obvious dipole such as polyolefin's, e.g. polyethylene, will not in themselves exhibit any dielectric response however, in many instances; impurities present will allow investigation even in these cases.

Humidity Generator and Controller

The **Humidity Generator and Controller** is a unique and flexible solution to deliver an accurate relative humidity useful for multiple applications.



Gas is pumped through a desiccant built into the instrument. A valve, controlled by a humidity sensor placed at the sample site, is used to divert some gas flow through a water reservoir before being pumped through to the sample. This feedback function ensures that the humidity selected is the real humidity at the sample site.

The temperature of the water reservoir can be set manually or via software to optimise ease of achieving desired humidity.

Software allows ramping or static humidity experiments to be constructed with output of humidity profiles vs time into Microsoft Excel™

Features:

- Includes Triton Laboratory © software.
- Connection to destination chamber of instruments requiring humidity control requires minimal engineering in most instances.
- "Sample site" humidity feedback control.
- Easy portability with compact design.
- Heated transfer line to avoid condensation.

Specifications:

Humidity Range: 5% to 90% (25°C)
10% to 80% (80°C)

Temperature Range: 5°C to 85°C

Max. sample chamber volume: 200 cc (Approx)

NEW...identiPol QA Quality Control of thermoplastics



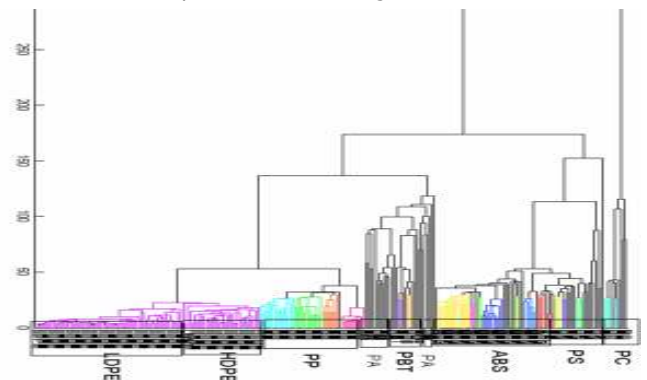
The principle behind this technology is a variant method based on well founded thermal analysis procedures.

The success of this unit depends very much on the novel, Pat. Pending (UK 0719768.4) sample holder and preparation procedure. This allows material in pellet or other forms to be moulded consistently while at the same time providing a support lattice throughout the prepared sample. This enables consistent heat transfer. This in turn allows for rapid analysis of the material.

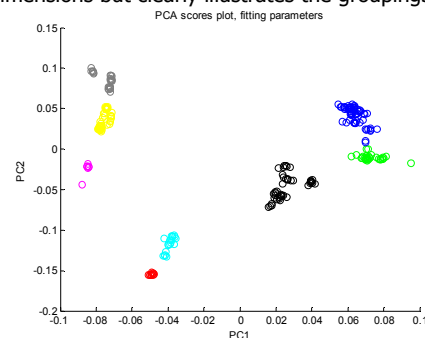
As this methodology is not based on optical spectrographic technology, no issues arise from using filled materials including carbon black as thermal and mechanical properties are little affected by these additions where as optical methods are.

A full thermal profile which includes relaxation, crystallisations and melts is reduced by mathematical means to a simple statistical probability. These procedures were developed jointly by the Chemometrics Department at Bristol University in the UK and Triton Technology Limited.

The raw data can be presented as dendrograms:-



Alternatively, the data can be presented as cluster diagrams (see below). Each colour represents a different polymer in a multidimensional matrix. The diagram below is shown only in 2 dimensions but clearly illustrates the groupings:-



Both methods show very well how polymer types can be grouped effectively using this technique.

A reference training set is created for a known thermoplastic material of acceptable quality. A statistical measure of similarity is then given for subsequently tested unknown samples compared to the training set. It is this value that is the normal output from the identiPol unit.

Dielectric Thermal Analysis of sucrose powder

Summary

This is an example of the ability of the DS6000 DETA to examine powdered materials such as sugars. The Glass Transition (T_g) is a very important characteristic of foodstuffs affecting the texture of many foods in their final state. Sugars such as lactose are also very important in the pharmaceutical industry. It is therefore useful to be able to examine such materials with different approaches in order to fully understand the T_g process. With techniques such as differential scanning calorimetry (DSC), the observed T_g process is often weak and hard to fully characterise. This is not the case with relaxation spectrographic techniques such as DETA,

Experimental

Approximately 100mg of freshly milled sucrose was placed in the cup electrodes of the DS6000 DETA. The sample was run from around -20°C . A second sample prepared in the same manner was exposed to ambient humidity for a day. This was then run in the same manner and compared with the first set of data. The samples were run at 1kHz at $2^\circ\text{C}/\text{minute}$

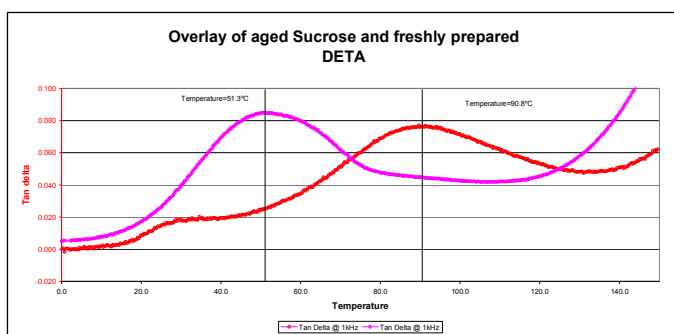
Result and Conclusion

The **red** data below is from the freshly prepared sample run immediately. It illustrates very clearly the relaxation processes in this particular material.

Two processes are observed on this sample. One at 30°C and another at around 90°C maximum.

If moisture is absorbed by the material, the effect should be to lower the glass transition (T_g) of the main amorphous peak at 90°C to a lower temperature as it is absorbed.

This was confirmed when we compare the data from the second experiment (shown in **pink** in the overlay data below) with the first experiment on the freshly prepared sucrose powder. Note that the relaxation peak after exposure remains relatively high in amplitude and there is no evidence of the lower temperature peak that was visible in the first set of data.



Special Offers on Shimadzu Thermal Analysers (UK only)

For a limited period, Triton Technology Ltd. has special offers on DSC60 and DTG60 Shimadzu Thermal Analyser systems.

The **DSC60** can now be purchased in the UK from just **£8,500** excluding VAT. This will include a start up kit with single channel software, tweezers and a supply of aluminium pans.



A range of optional accessories are available including crimping/sealing tool, gas switching boxes, auto cryo systems etc.

Included in this deal is FREE installation and training.

The DTG60 is a TGA with a simultaneous DTA signal. This means that calibration of temperature can be easily done with conventional standard materials such as indium etc. rather than unreliable and expensive paramagnetic standards.



Surprisingly, the cost of this simultaneous TGA/DTA analyser is no more than many TGA only systems from other suppliers.

The DTG60 M (ambient to 1100°C) is currently on special offer at **£15,500** excluding VAT. This includes TA60WS multi-channel interface, software and start-up kit.

As with the DSC60 deal, FREE installation and training are included for a limited period.

Other model configurations of both DSC60 and DTG60 offer auto samplers. The DTG60 is also available with a temperature range extended to 1500°C .

To complete the TA range, the Shimadzu TMA60 provides users of TMA with an excellent static/dynamic load TMA with capabilities up to 5N loading and a displacement capability of $\pm 5\text{mm}$.

Standard unit has a temperature range ambient to 1000°C with options of -150°C to 600°C or ambient to 1500°C .

Prices start from just **£19,500** excluding VAT.



For additional information on any item in this Newsletter, please contact:

Glynn Van-de-Velde
Triton Technology Ltd.
3 The Courtyard
Main Street
Keyworth
NG12 5AW

Tel 0115 937 5555

Fax 0115 937 6581

Email glynn@triton-technology.co.uk

Web Site: www.tritont.com