



DYNAMIC MECHANICAL THERMAL ANALYSIS

Scion's Dynamic Mechanical Thermal Analysis (DMTA) can help manufacturers characterise the mechanical and thermal properties of materials to produce innovative, cost-effective high-performing products.

Increasing demand for high performing products makes it important to understand the complex mechanical and thermal properties of materials. In everyday use, materials encounter a range of mechanical stress and strain challenges, as well as exposure to a range of environments, including temperatures, humidity and solvents (liquids). Scion offers the skills and services needed to test the suitability of materials for end-use performance.

FOR MANUFACTURERS

Scion's advanced Dynamic Mechanical Thermal Analysis (DMTA) is used to characterise the mechanical properties and thermal behaviour of composites, plastics, elastomers, foams, wood, MDF panels, resins, films, metals, ceramics, glassy and crystalline composites. These materials have applications in nearly every industry.

This resource includes **Dielectric Thermal Analysis (DETA)**, a technique useful for monitoring cure or crosslinking in liquid thermosetting resins, composite materials, adhesives and paints.

Scion's DMTA enables a wide range of mechanical and thermal measurements to be taken, including:

- Modulus of Elasticity and Shear Modulus
- Complex Moduli, Storage and Loss Moduli
- Damping Properties
- Frequency Effects
- Creep and Recovery
- Stress Relaxation
- Glass Transition Temperature
- Secondary Transitions
- Crystallisation
- Softening and Melting Temperature
- Time-Temperature Superposition
- Phase Separation.

UNIQUE IN NEW ZEALAND

This is the most advanced DMTA platform available in New Zealand for dynamic mechanical analysis measurements of the viso-elastic properties of materials from -150°C to 600°C, in both air or liquid. It can perform many additional measurements, including: stress ramps, strain rate ramps, iso-strain, iso-force, fatigue, multi-wave, and DETA.



New capabilities this equipment offers includes:

- Test to failure, in combination with thermal analysis enables the strength testing of specimens around 12 times smaller than traditional mechanical testing sizes. It is a key capability when working with limited sample quantities, often when developing new materials.
- Thermal in-situ monitoring of mechanical tests (real-time monitoring using a camera ensuring accurate and reliable test results).
- Conductive polymer and resin reaction characterisations via dielectric techniques (increasingly used in polymer developments).
- Thermomechanical analysis to study the thermal expansion of materials.
- Immersion testing, for example, influence of water or solvent on the softening point of bioplastics.

These precise measurements of material properties allow manufacturers to test newly developed materials, including biomaterials, and to comply with industry standards for materials performance.

DMTA IN ACTION

Scion researchers have used this technology to test the mechanical properties of plastics, supercritical CO₂ modified wood, biofibre composites, resins, bioplastics, foams, bioadhesives as well as development and testing of coatings, paper, MDF and other materials for commercial customers.

The DMTA can also be used for quality control of commercial process. For example, in the resin industries it is often used to control the consistency of the end composites using different batches of the same resin and to determine properties such as heat deflection temperature.

By comparing paint substrates and their glass transition (T_g), this apparatus has been applied to a paint coating delamination problem. In another project, the relative cured state of epoxy and polyester resins has been quantified.

WORKING TOGETHER

Scion can tailor contractual relationships to meet the specific needs of each customer. These could include:

- Service provision, where we undertake specific projects for clients, usually involving specialised testing and problem solving.
- One-on-one confidential research projects targeted to maintain client competitiveness.
- Joint technology development partnerships with joint risk and reward.
- Strategic multi-party alliances to address sector-based challenges and innovation opportunities.

CONTACT

Florian Graichen
Science Leader, Biopolymers & Chemicals
Email: florian.graichen@scionresearch.com

Jeremy Warnes
Business Development Manager, Biomaterials
Email: jeremy.warnes@scionresearch.com

Dawn Smith
Research Leader, Polymers & Composites
Email: dawn.smith@scionresearch.com

Marie Joo Le Guen
Materials Scientist, Polymers & Composites
Email: mariejoo.leguen@scionresearch.com

Phone: +64 7 343 5899