KINECTRICS

Supporting Capabilities

MATERIALS LABORATORY

Our materials laboratory has the following facilities:

- Fume hoods for polymer synthesis;
- A thermal analysis suite
  - Differential Scanning Calorimetry (DSC); with temperature range -180°C to 725°C, to measure Melt behaviour, curing behaviour, crystallinity and the glass transition temperature of polymer
  - Thermogravimetric Analysis (TGA); to analyse the degradation behaviour of a sample (e.g. degradation temperature, degradation rate), this can be determined in air, nitrogen or other inert gases
- A planetary mixer for higher shear mixing and dispersion
- A small-scale extruder (Brabender); for blending, extrusion and pelletisation of small-scale development samples
- A large press for producing test samples
- Potentiometric titration equipment to measure; pH, acid, epoxide, hydroxyl and amine numbers of a range of both solid and liquid materials

ANALYSIS FACILITIES

The materials laboratory contains the following analysis facilities:

Spectroscopy Suite

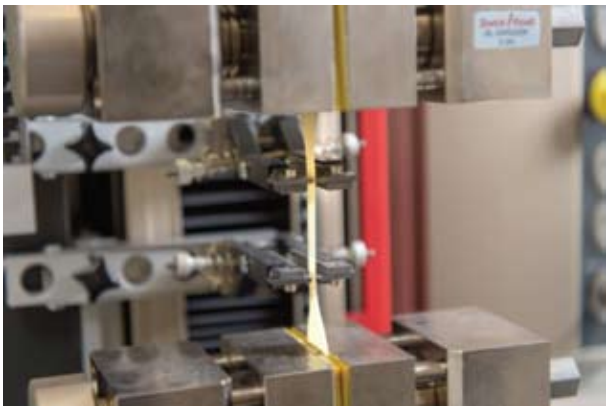
Spectroscopy at Gnosys is one of our most well-established capabilities including: Fourier Transform Infrared (FTIR); Raman; UV-VIS-NIR; Optical Emission Spectroscopy (OES); Ultra Violet (UV) spectroscopy.

Spectroscopy can be used for the following analysis:

- Materials identification - type, structure, properties
- Ageing analysis – spectroscopy indicates chemical changes in materials due to ageing; this can be linked to material strength by using the tensometer and our bespoke chemometrics package
- Failure analysis – chemical changes can indicate the reason for sample failure
- Impurity identification – independent spectral analysis to determine contamination

Our software development team has worked with us to produce a bespoke chemometrics package (Transchem) which enables us to analyse our spectroscopic data in much greater depth. Transchem allows us to combine spectroscopic data with other properties (for example tensile strength, elongation at break, viscosity, Tg, ageing time) to produce calibration models which enable the property of the material to be predicted accurately. These models can be used as quality assurance tools, to predict product lifetime or measure small changes in product chemistry.

Mechanical Testing Suite



- Universal tester with tensometry and puncture resistance test;
- Durometer;
- Scratch tester

Combining analysis carried out using spectroscopic and mechanical analysis, typical work we carry out on behalf of our clients includes:

- NDT (non-destructive testing) of samples - spectroscopy uses light to give chemical information. We can do this in our laboratory or at a client site - using our portable equipment for FTIR, Raman or UV-VIS-NIR
- Models provided for clients that help them to establish how long their product will last
- Information provided about the chemistry of samples received and prediction of impurities, contamination and indicators of ageing, for example.

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