MATERIALS PROCESSING & CHARACTERISATION

Scion's materials characterisation and processing equipment is available to commercial clients.

MATERIALS CHARACTERISATION

- **FE-SEM** - Field Emission Scanning Electron Microscope with TEM capability and nanometer resolution, with EDAX (elemental analysis).
- **FTIR Microscope, Laser Confocal/Fluorescent Microscopes** and other types of microscopes (e.g. optical, hot stage with digital photography).
- **DMTA** - Dynamic Mechanical Thermal Analyser (TA with humidity/wet testing capability for polymer and other materials characterisations). Determines thermal and mechanical properties on small samples and can be adapted to measure HDT (heat distortion temperatures), creep, low and high temperature tests; digital photography incorporated. Integrated **DETA** (Dielectric Thermal Analyses) used for monitoring cure or setting or solidification or changes in fluidity in resins.
- **DSC** - Differential Scanning Calorimetry (TA). Measures thermal transitions, crystallinity and exotherms of reactions and heat capacities (via modulated DSC). Also measures oxidation induction times (as a measure of stabilisation/stabiliser level detection/antioxidant effectiveness).
- **TGA** - Thermogravimetric Analyses (TA). Measures weight loss versus temperatures up to high temperatures as a measure of thermal stability or off-gassing/temperatures of decomposition.
- **Rheometer** (TA Instruments Advanced Rheometer 2000; up to 600C, variable frequency/shear rate). Provides detailed data on viscosity/rheology of polymers including plastic melts.
- Brookfield Rotational and Cone & Plate **Viscometers** - measure viscosities of liquids or low melting polymers.
- Polymer Labs **GPC** - Gel Permeation Chromatography (for molecular weight analyses of synthetic and biopolymers).
- **Instron & Zwick Testing Machines** - various (tensile, flexural properties of materials), some with heat/environmental chambers.
- **Impact Tester** - fully automated Izod and Charpy capability to ASTM & ISO standards.
- **Cyclic creep/humidity testing** for packaging and other materials characterisation.
- **Box/packaging testing** - various mechanical and environmental testing including cool store testing.
- Creep testing.
- Large structural beam/testing equipment.
- Wood durability, stability, strength and performance.
- Polymer foam tests.
- ProScan Materials Density Profiler.
- Contact angle measurement and Cahn balance - measure of water interactions.
- Fibre-Lab and other fibre/paper characterisation equipment.

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- Fibre-water absorption testing.
- Moisture vapour transmission rate testing (MVTR), several units.
- QUV - UV/humidity/temperature cycling: accelerated weathering testing.
- Colour measurement.
- Adhesive testing equipment.
- Anti-fungal and anti-microbial/challenge testing.
- Wood/biomaterial preservation-degradation testing facilities.
- Biodegradation & compostability testing facilities.
- Ecotoxicolgy testing.
- Flow cytometry.
- Life Cycle Analyses (LCA) evaluations.

MATERIALS PROCESSING/SYNTHESIS

- OMC Laboratory Twin Screw Extruder with feeder, strand pelletiser, variable screw configurations, water bath, liquid feeder, and calendaring/film equipment.
- LabTech LTE26-40 Twin Screw Extruder (l/d 40; 26mm screw; 15 kw main drive; co-rotating) with hopper, feeders, strand pelletiser LZ 120, water bath multi-strand die, variable screw configurations etc . Instrumented.
- Labtech Film Line (extrusion).
- LabTech Single Screw Extruder LBE20-30C (l/d 30; 20mm screw) with feeders.
- Larger scale (60mm) extruder with fittings for **wood plastic composites extrusion/profiles**.
- Driers/feeders - extrusion accessories, various.
- Cross head die extrusion: cable coating; long fibre reinforced plastics.
- Extrusions - cast film and profile extrusions.
- Die Face (air cooled) Pelletiser.
- Batch pre-mixers, 5 and 20 litre.
- Laboratory thermoformer/lamination.
- Boy 35t and 15t injection moulding machine.
- Weverk Press, fully automated.
- Siempelkamp Press, fully automated.
- Polymer foaming, various types and scales of equipment for various foams (urethane, phenolic, polyester etc.).
- Diaphragm/resin infusion/vacuum assisted composite moulding apparatus.
- Mechanical Fibre Processing Pilot Plant (pulp and MDF manufacture plant).
- Chemical pulping equipment, various.
- Fibre mat making.
- Continuous fibre impregnation line.
- Fibre treatments.
- Composite manufacturing, various.
- Maxi-blender fibre coating and dispersion equipment.
- Paper-making, coating and paper testing equipment.
- Fibre-cement manufacturing equipment.
- Choppers/pelletisers.
- Hammer mill.
- Large sieving apparatus.
- Freeze driers.
- Supercritical drying.
- Spray driers/encapsulation and microencapsulation.
- Emulsion (1L) and various aqueous/polymerisation reactors (up to 20L).
- Polymerisation and polycondensation reactors.
- Bioreactors and microbial polymerisations.
- Supercritical Fluids Reactor and Supercritical Fluids (CO_2) Extraction, various.
- CO_2 mediated processing of polymers and composites.
- Film casting equipment.
- Bioreactors and pressurised reactors, various.
- Steam explosion apparatus.
- Wood drying/processing/impregnation.
- Coatings and adhesive preparations and testing.
- Chemical and polymer extractions.
- Aqueous and solvent extractors.
- Biomass processing/pre-treatments reactor equipment.

CHEMICAL ANALYSES

- Multinuclear solid state NMR incl. 1H imaging at 200 MHz.
- Multinuclear solution state NMR at 400 MHz.
- Pyrolysis GC-MS.
- GC-MS (TQ) including headspace/volatiles and olfactory.
- Other chemical analyses equipment:
  - AA, FTIR with ATR
  - UV-VIS (incl. solid state reflectance and stop/ continuous flow cell)
  - HPLCs
  - GCs
  - ICP-MS, trace element analyses etc.
- IC for carbohydrates.
- Expertise in natural polyphenol (lignin; tannin) and sugar/polysaccharide analyses.
- Water/wastewater and various biomass analyses.
- NIR (Near Infra-Red spectrometry).
- TOGA - Titrimetric Off Gas Analysis - measures gasses evolved under range of conditions.
- Food contact mitigation testing.

PRINTING

- Lab/troubleshooting equipment.
- IGT F1 laboratory flexo press; IGT AIC2-5 laboratory offset press.
- RK K303 multicoater/printer with Flexo & Gravure printing head.
- RK K202 laboratory control coater.
- Canon iP4500 inkjet printer with dye-based ink system.
- Epson TX 4000 inkjet printer with pigment based ink system.
- FTA 1000 contact angle and surface analyser.
- QEA camera and software for print quality characterisation.
- Macapol P230 polishing equipment for sample preparation for cross-sectioning.

CONTACT

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