

**The Polymer Market** consists of a huge diversity of manufacturers of industrial products running many different processes yet still facing similar challenges. There is more and more pressure to achieve high product quality and reduce costs in order to stay one step ahead of the competition.

With our instruments and expertise, we can help you:

- Save money and ensure effective quality control
- Streamline your processes for outstanding operational efficiency
- Implement cost effective solutions by reverse engineering

## Polymer Processes

Resin Development	Resin Manufacture	Compound Development	Compound Manufacture	Product Forming	Recycling
<p>Optimization of materials to ensure robust downstream applications</p> <p>Optimization of reaction times, end points and curing processes to reduce costs</p> <p>Presence of residual monomers</p>	<p>Ensuring resins meet agreed specifications</p> <p>QC of in-process and final products; determination of crystal orientation</p>	<p>ID of chemical composition and interactions of additives</p> <p>Accelerated life testing and biodegradability studies</p> <p>Study effects of chemical or environmental degradation</p> <p>Optimization to improve flow, strength and stiffness</p> <p>Poly-dispersion analysis</p>	<p>ID of raw materials and QC of finished product to ensure correct mix and distribution of additives</p> <p>Reverse Engineering</p>	<p>QC of raw materials and finished products; troubleshooting product defects</p> <p>Optimization of extrusion/molding to minimize energy consumptions, reduce scrap and ensure safety</p>	<p>Classification of materials for recycling and disposal</p>



### Solutions for...

- Packaging film manufacturers
- Tire and rubber industries
- Plastic goods and components manufacturers
- Paint and resins manufacturers
- Automotive, aviation, space and defense
- Academics and research institutions

## Solutions for Polymers focused on providing more insight into product performance and process optimization

Material Science is becoming increasingly important, new technologies and applications make it easier to meet your daily challenges and regulations in a more cost efficient way. Our comprehensive portfolio of thermal analysis, molecular spectroscopy, chromatography and hyphenated techniques is the ideal choice for ensuring the quality and reliability of polymers.

<p>Glass transition &amp; melting temperatures; crystallinity, heat of fusion, reaction rates, specific heat and heat capacity, curing, safety and stability studies</p>	<p><b>Differential Scanning Calorimetry</b></p> <p>DSC 4000/6000      DSC 8000/8500</p>	<p>Modulus, stiffness, damping, crystalline, alpha and beta transitions, glass transition &amp; melting temperatures</p>	<p><b>Mechanical Analysis</b></p> <p>DMA 8000      TMA 4000</p>
<p>Wt % Additive &amp; bi-product losses, Wt % Fillers &amp; Ash, Decarboxylation, Pyrolyzation, Decomposition and Stability studies</p>	<p><b>Thermogravimetry</b></p> <p>STA 6000/8000      TGA 4000      TGA 8000</p>	<p>Identify and quantitate evolved gases in resins and compounds</p>	<p><b>Hyphenated Techniques</b></p> <p>TL-9000 TG-IR- GC/MS</p>
<p>Identify and Quantitate organic molecules and compounds Understand chemical &amp; physical composition of laminates &amp; adhesives Troubleshoot chemical origin of occlusions Identify orientation of molecules</p>	<p><b>Molecular Spectroscopy FTIR &amp; FT-NIR / Chemical Imaging</b></p> <p>Spectrum Two™      Frontier™ Spotlight 400 FT-IR</p>	<p>Identify and quantitate additives</p>	<p><b>Liquid Chromatography/Mass Spectrometry</b></p> <p>Altus™ HPLC      QSight™ LC/MS/MS</p>
<p>Volatile compounds in packaging material</p>	<p><b>Gas Chromatography/Mass Spectrometry</b></p> <p>TurboMatrix™ Headspace &amp; Thermal Desorber      Clarus® GC, Clarus® SQ.8 GC/MS</p>	<p>Reflectance, transmission and absorption measurements for color, HAZE, turbidity, aging, coatings, glass and solar cells</p>	<p><b>Molecular Spectroscopy UV/Vis &amp; UV/Vis/NIR</b></p> <p>LAMBDA 650/750/850/950/1050</p>

**MULTIPLE TECHNIQUES - MULTIPLE EXPERTISE FROM ONE COMPANY**

- For performing QA/QC applications
- For studying processes in polymers
- For research & development