

MATERIALS PROCESSING

PROCESSING EQUIPMENT

- Film & Fabric Laminator
- Coating Machine
- Rubber Mill and Banbury Mixer
- Monolayer Film Extruder (Cast & Blown Film).
- Multi-layer Film Extruder (7 Layers).
- Chemical Reactor
- Injection Molding Machine
- Filament Winder
- 5 Large High-Tonnage Presses
- Machine Shop
- Lay-up Room with Large Ovens
- Chemical Storage
- Chiller, Heat Exchanger
- High Bay with Overhead Crane
- Large Oven for Composite Curing



CORE COMPETENCIES

- Textile Technology
- Coated Fabrics
- Elastomer Technology
- Elastomeric Molding
- Barrier Film Technology
- Adhesives Technology
- Thermoplastic Film Extrusion
- Thermoplastic Injection Molding
- Analytical Chemistry
- Failure Analysis
- Materials Regulatory Issues
- Composites Technology

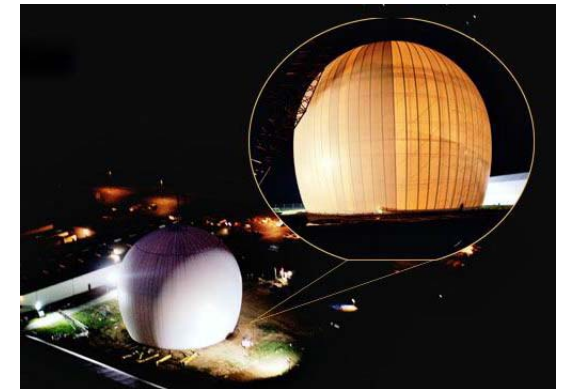
MATERIALS DEVELOPMENT GROUP

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ILC DOVER
RESEARCH AND
TECHNOLOGY

TECHNOLOGIES
FOR ADVANCED
MATERIALS



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creating what's next

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ANALYTICAL LABORATORY

THERMAL ANALYSIS

DIFFERENTIAL SCANNING CALORIMETRY, DSC, (-90 ° TO 500 ° C)

- Melt Point and Heat Flow
- Degree of Crystallization and Temperature
- Glass Transition Temperature, T_g
- Degree of Cure
- Oxidative Stability



THERMOGRAVIMETRIC ANALYSIS, TGA, (25 ° C TO 1000 ° C)

- Thermal Stability
- Out gassing
- Degradation Temperature
- Composition %



DYNAMIC MECHANICAL ANALYSIS, DMA (-143 ° C TO 600 ° C)

- Glass Transition Temperature, T_g
- Storage & Loss Modulus, $\tan \delta$
- Stress-Strain
- Creep



ANALYTICAL INSTRUMENTATION

- **FT-IR**, used for organic compound ID, composition & analysis. Good for solids and liquids.
- **Gas Chromatograph**, used for separation and identification of chemical in complex mixtures.
- **Phosphorous Analyzer**, used to determine the concentration of phosphorous as a chemical agent challenge to M-40 mask filters.
- **Spectronic 20**, a spectrometer that measures the amount of visible light absorbed by a colored solution, to determine the concentration of a chemical in a solution. UV-Vis range, 300-1000 nm.
- **Karl-Fisher**, used to determine moisture content.
- **Brookfield Viscometers, pH Meters, Specific Gravity**
- **Sieves**, for particle size distribution
- **Titration Equipment, Nitrogen Generators, Analytical Balances, Liquid Nitrogen Large Dewar's.**
- **Chemical Hoods, Water Circulating Baths, Vacuum Chamber.**

MICROSCOPY

Olympus BX51 Compound Research Microscope

- Brightfield/Darkfield
- Automated Stage
- 12.5, 50, 100, 200, 500, & 1000x Magnification
- Transmitted/Reflective Light
- Polarized Light
- DIC, Differential Interference Contrast
- Digital Camera
- SIS, Image Analysis Software



Nikon SMZ-U Stereo Microscope

- Continuous, 0.75 to 7.5x Magnification
- Reflected Light
- Digital Camera
- Image Editing Software

Olympus Inspection Scope

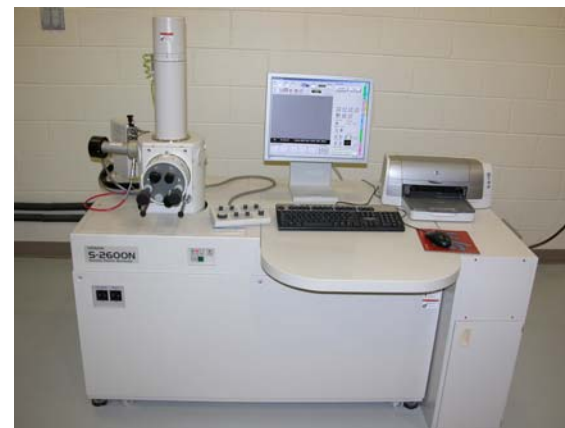
- Image Capture
- Fixed and Zoom Lenses to 500x

Olympus iPlex sa Industrial Boroscope



Hitachi S-2600N Variable Pressure Scanning Electron Microscope (SEM)

- DSU-ILC-SEM Coop Agreement, DSU owned. Joint operation by ILC & DSU
- Magnification: 25x–300,000x
- Resolution: 4nm (in high vacuum mode)



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