

Nanoparticle Synthesis Capability

Nanoparticle Synthesis/Processing:

SPEX 8000M Mixer/Mill, Planetary and Centrifugal Mixer (Thinky), EKART 3 - Roll calendaring, Rheometer AR200 (TA Instruments), Sharp Microwave-1000W/R-21HT, High Intensity Ultrasonic Liquid Processor: VCX-750: Sonics and Materials Inc., First nano-300 Easy Tube CVD equipment, Harris Plasma Cleaner, microfluidics device for dispersion of nanoparticles in polymers, Forcespinning® and Electrospinning setups for nanofiber synthesis.



Chemical Vapor Deposition (CVD)
EASYTUBE® 3000

- *Synthesis of graphene nanoparticles
- *Growth of nanoparticles on substrates



Microwave Synthesis of Nanoparticles
Microwave – 1000W/R-21HT

- * Synthesis of particles from micro to nanoparticles



Ball Milling

Mixer/Mill 8000D™ (SPEX)

- *Synthesis of particles from micro to nanoparticles
- *Wet and Dry Ball Milling
- *Stainless Steel and Zirconia Balls

Nanoparticle Processing Capability



Rheometer AR 2000 ETC



Three Roll Shear Mixer



Ultra sonication



Hot Plate Magnetic Stirrer

Nanoparticle Characterization Capability



Transmission Electron Microscope (TEM)

JOEL JSM 5800 SEM

- *Provides Topographical/Compositional and crystalline analysis of materials
- *Interfacial flaws, fractures and damages in micro-sized materials.
- *Dispersion of nanoparticles



X-Ray Diffraction (XRD)

RIGAKU DMAJOEL JSM 5800

SEM

- * Morphological/Topological Microstructural Analysis
- * Failure Analysis



Scanning Electron Microscope (SEM)

JOEL JSM 5800 SEM

- *Morphological/Topological Microstructural Analysis
- *Failure Analysis/Mode
- *Interfacial Analysis

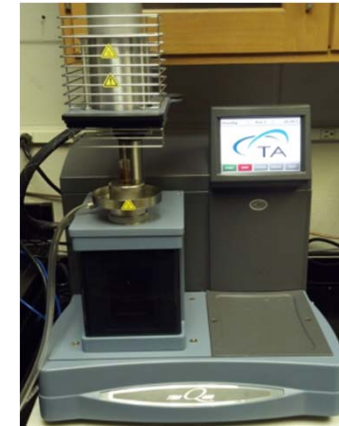
Polymer Characterization Capability



Rheological



Differential Scanning Calorimetry



Thermo-mechanical Analysis



Thermo-Gravimetric Analysis

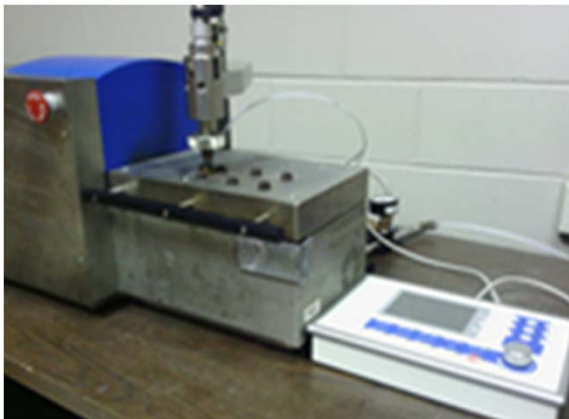


Dynamic Mechanical Analysis

Composite Manufacturing Capability

Composite Fabrication:

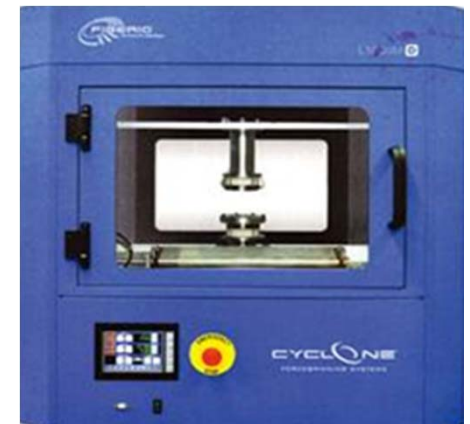
Equipped with powder drying & mixing, Winding Machine: filament cooling and heating system, Wabash hot press (Genesis G50H-30-X), Twin Flow Compact Variable Ratio Resin Transfer Molding Metering, Mixing and Injection Equipment, 5' x 5' x 2.5' pneumatically operated, bottom up and air bag controlled RTM press, Heated, Closed RTM molds, Autoclave, Tetrahedron hydraulic press and Carver press. Thermo-Fisher Scientific Twin Screw extruder, Extruder



Thermo-Fischer - Twin Screw
Extruder



Wabash Hot Compression Press



Force and Electro-Spinning of
Fibers

CYCLONE 100M

- * Spinning of fibers
- * Interfacial Analysis

Mechanical Characterization Capabilities

Mechanical Characterization:

50 and 110 Kips MTS equipments with Uni- and Biaxial Testing Capability and environmental chamber (-100 °C to 350 °C). Split Hopkinson pressure bar setup for high strain rate testing, Gas gun for ballistic impact damage for metals and composites, Low Velocity Dynatup Impact Tester, Zwick/Roell Z2.5.



Uniaxial MTS



Low Velocity
Impact



Zwick Roell – Z 25



MTS – Tensile/Torsional



High Velocity
Impact



High Strain Rate Impact
Test

Environmental Conditioning Capability

Environmental chamber: QUV environmental weathering chamber for conditioning.
UV Lamps: 310 – 340nm
Moisture @ 50 – 60 °C
Dew: and Rain simulation



Environmental chamber: Biaxial Testing Capability and environmental chamber (-100 °C to 350 °C)

