

PCL Thermal and Rheology, IV Lab

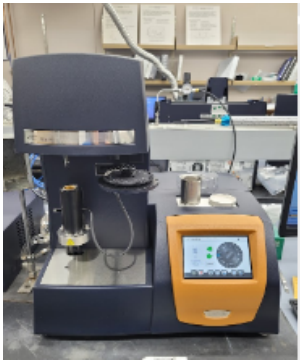
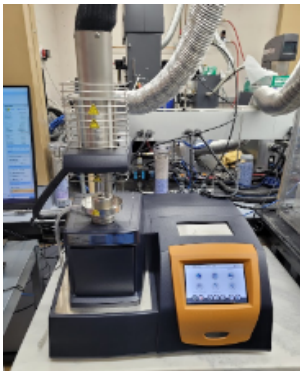
Principle

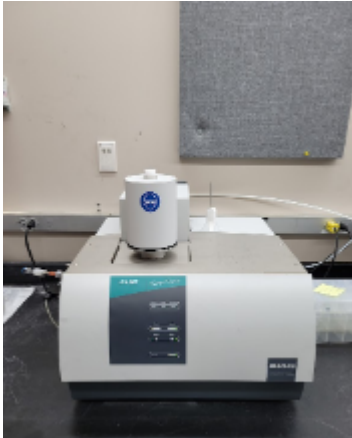
Thermal and Rheology, IV

Capabilities

- TGA, DSC, TMA, DMA
- Thermal Conductivity
- Capillary Rheology
- Melt Flow Index
- Inherent Viscosity
- Solution Rheology

Equipment: Thermal

	Equipment Type	Information
	Differential Scanning Calorimetry	• Differential Scanning Calorimetry measures heat flow as a function of time or temperature ◦ ASTM D3418; -90°C to 550°C in N2 ◦ Tm, Tc, Tg, percent crystallinity, heats of fusion and crystallization, rate and degree of cure, specific heat capacity
	Thermogravimetric Analysis	• Thermogravimetric Analysis measures mass change as a function of time or temperature ◦ ASTM E1131 up to 1000°C in N2 or air ◦ Compositional analysis, thermal stability, decomposition kinetics, filler content
	Thermomechanical Analysis	• Thermomechanical Analysis measures dimension change as a function of time, temperature, or force ◦ ASTM E831 and ISO 11359; -70°C to 1000°C ◦ Coefficient of linear thermal expansion

	Dynamic Mechanical Analysis	• Dynamic Mechanical Analysis mechanically deforms samples and measures response with respect to frequency, stress, strain, time, or temperature ◦ TA Instruments ARES-G2 Rotational Rheometer - Parallel plate, torsion, 3 point bend, and films ◦ Forced convection oven up to -150°C to 600°C ◦ Viscoelastic properties, storage modulus, loss modulus, Tg, cross-linking, lifetime predictions
	Thermal Conductivity	• Thermal Conductivity measures materials ability to conduct heat ◦ ASTM E1461 Thermal Diffusivity by Laser Flash

Equipment: Rheology

Wide range of techniques for measuring flow behavior of materials

	Equipment Type	Information
	Melt Flow Indexer	• Melt Flow Indexer measures relative ease of flow and rate of extrusion ◦ ASTM D1238 and ISO 1133 Procedures A and B ◦ Melt flow rate, melt volume rate, melt density ◦ Capability to measure up to 425°C

	Capillary Rheometer	• Capillary Rheology measures shear viscosity and flow behavior ◦ ASTM D3835 and ISO 11443 ◦ Apparent shear viscosity and melt stability as a function of time, temperature, or shear rate ◦ Capability to measure up to 450°C
	Solution Rheometer	• Solution Rheology measures polymer solution viscosity as a function of time or shear rate with a concentric cylinder
	Dilute Solution Viscosity	• Dilute Solution Viscosity measures inherent viscosity of polymer solutions ◦ ASTM D5225 - Differential pressure viscometer ◦ ASTM D2857 - Glass capillary viscometer

Mission	Thermal and Rheology, IV is our mission.
Techniques	Thermal and Rheology, IV •

Team

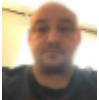
Thermal and Rheology IV Labs

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