Polymer Science and Engineering (Center for)

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The Center for Polymer Science and Engineering (CPSE) was formally established at Lehigh University in July 1988. The center provides a unique opportunity for faculty and students from the traditional departments of chemistry, chemical engineering, materials science and engineering, mechanical engineering and mechanics, and physics to perform interdisciplinary research in polymers. The center is an umbrella organization encompassing polymers research and graduate studies at Lehigh University. The center's primary missions are preparation of first rate scientists and engineers with proficiency in polymers, fostering cross-disciplinary polymer research, organizing and teaching continuing education short courses in areas of interest to the polymer industry; and organizing campus wide seminars.

The Polymer Science and Engineering (PSE) Graduate Program was established in 1975, when Dr. John A. Manson requested authorization to institute a graduate degree program in polymers. CPSE's Polymer Education Committee currently coordinates the PSE graduate program through the participation of academic departments. PSE offers a graduate certificate as well as several graduate degrees: Master of Science, Master of Engineering, and Doctor of Philosophy in Polymer Science and Engineering. Students may also elect to pursue studies towards a classical degree in their respective departments with an emphasis in polymer courses and research. Both advanced undergraduate and graduate courses in polymer science and engineering are offered through the participating departments. Current course offerings include physical polymer science, organic polymer science, mechanical behavior of polymers, rheology, polymer processing, emulsion polymers, polymer blends and composites, colloid science, and polymer interfaces.

Research Activities

The center has a wide range of research activities covering the field of polymers. The following are the major research themes: emulsion polymerization and latex characterization, surface/interfacial aspects of polymer colloids, polymer adhesion, polymer blends, polymer matrix composites, melt processing of polymers, and polymers for microelectronic packaging.

Research Facilities

The following research instrumentation is available for the Center for Polymer Science and Engineering: X-Ray Photoelectric Spectroscopy (ESCA), Scanning Auger Electron Spectroscopy, Laser Raman Spectroscopy, Mossbauer Spectroscopy, Nuclear Magnetic Resonance Spectroscopy of both solids and solutions (NMR) (3 instruments; 90 MHz, 300 MHz and 500 MHz), Fourier Transform Infrared Spectroscopy (FTIR) (both conventional and photo-acoustic), a variety of advanced transmission and scanning electron microscopes, modulated differential scanning calorimetry, hi-res-thermogravimetric analysis, instruments for rheological studies (including a TA Instruments Dynamic Hybrid Rheometer), particle sizing instruments (Coulter N4M, Joyce-Loebl Disc Centrifuge, Capillary Hydrodynamic Fractionation, and Hydrodynamic Chromatography), Gel Permeation and Gas Chromatography units, Electrophoretic Mobility apparatus, mechanical testing machines, and Polymerization Reactors, including Bottle Polymerizer, Tubular Reactor, Stirred Tank Reactors with on-line sample analysis for residual monomer and interfaced with computer for control operations.

Educational Opportunities

Programs of study for individual students are designed to meet the student’s interests, the requirements of the academic department,