Excellent experimental facilities exist in the Laboratory for the synthesis, analytical characterization and testing of polymers. The laboratory can provide services related to: (a) **Polymerization processes**, (b) **Characterization of polymeric materials**, and (c) **Chemical modification of polymers under processing conditions**. Moreover, the Laboratory can undertake analytical and consultative services concerning the quality control of the polymers and polymeric products.

The services already provided by the LPRE are the following:

1. **CAD/CAM OF POLYMERIZATION PROCESSES**

- Investigation of polymerization processes in fully automated high-pressure pilot scale units
- Development of advanced software for the design, optimization and control of polymerization processes.

- **CHARACTERIZATION OF MOLECULAR PROPERTIES**

- Determination of the viscosity average molecular weight of polymers by Ubbelholde Viscometer.
- Determination of the molecular weight distribution of polymers by Gel Permeation Chromatography (GPC).
- Qualitative and quantitative characterization of polymeric and non-polymeric materials (e.g. solutions, membranes, particles and fibers) by Infrared Spectroscopy (FT-IR).

- **CHARACTERIZATION OF THERMOMECHANICAL AND OTHER PHYSICAL PROPERTIES**

- Thermal analysis of polymeric and non-polymeric materials by Differential Calorimetry (DSC).
- Thermal analysis of polymers and non-polymers by Thermogravimetry (TGA).
- Measurement of molecular diffusion coefficient of polymers by Dynamic Light Scattering.

- **CHARACTERIZATION OF POLYMERIC PARTICLES AND EMULSIONS**

- Determination of the particle size and drop size distribution by Laser Diffraction Sizer
- Determination of particle size distribution by Dynamic Light Scattering.

- Determination of particle and drop size distribution by Optical Microscopy - Image Analysis (400X-5000X).
- Observation under the optical microscope, sample photographing, digital imaging and advanced image processing.

- **CHEMICAL MODIFICATION OF POLYMERS UNDER PROCESSING CONDITIONS**
- Investigation of the chemical modification of polymeric materials under processing conditions by reactive extrusion using a Mixer-Brabender Plasticorder.