

A New Apparatus for the Measurement of Polymer-Solvent-Monomer Phase Equilibria at Process Conditions

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A new visual apparatus has been designed to measure solid-liquid and liquid-liquid equilibria of polymer-solvent-monomer systems at process conditions. Measurements to date include SLE and LLE for polyethylene-solvent-ethylene systems and polypropylene-solvent-propylene systems at temperatures up to 200 °C and pressures up to 10 MPa. Mixtures containing up to 30 weight percent polymer are easily equilibrated by means of a magnetically-coupled stirrer. The internal volume of the cell is approximately 50 cc. An optional floating piston can be used to vary the cell volume and pressure, which facilitates the measurement of LLE as a function of temperature and pressure. The apparatus will be described in detail, and phase equilibrium results will be presented for a model polymer-monomer-solvent system.