

Cosolvent Effect and Solubility Measurement for Butyl (Meth)Acrylate Polymers in Benign Environmental Supercritical Solvents

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Experimental data to 235°C and 3,000 bar are measured for binary and ternary mixtures of poly(n, iso, tert-butyl methacrylate)-CO₂-n, iso, tert-butyl methacrylate and poly(n, iso, ter-butyl acrylate)-supercritical solvents-n, iso, tert-butyl acrylate systems. Also, Pressure-composition isotherms are obtained for the CO₂-iso-butyl acrylate and CO₂-iso-butyl methacrylate systems at 40-120°C and pressure up to 160 bar. The experimental results for CO₂-iso-butyl acrylate and CO₂-iso-butyl methacrylate systems are modeled using Peng-Robinson equation of state. The phase behavior of the poly(n, iso, tert-butyl methacrylate)-CO₂ system presents a negative slope with dissolve at temperature of 235°C and pressure of 2,600 bar. The cloud-point curve for poly(n, iso, tert-butyl acrylate)-CO₂ mixture exhibits upper critical solution temperature(UCST) region phase behavior with a negative slope. The phase behavior for poly(n, iso, tert-butyl methacrylate)-CO₂ mixture shows smooth UCST type.