

Cosolvent effect of Phase Behavior for the Poly(2-phenylethyl methacrylate) + Cosolvent Mixture in Supercritical CO₂

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In this work, methacrylate and acetate groups have weakly polarity and show the non-ideal phase equilibria. The cloud-point and vapor-liquid experimental data at various temperatures and several pressures are reported for two-component and three-component mixtures of poly(2-phenylethyl methacrylate) [P(2-PEMA)] + supercritical CO₂ + co-solvents [2-phenylethyl methacrylate (2-PEMA), phenyl acetate (PAe) and 2-phenylethyl acetate (2-PEAe)] systems. The product data for the P(2-PEMA) + co-solvents mixture under supercritical CO₂ are measured at up to 474.8 K and up to 200.86 MPa. Product source for the P(2-PEMA) + CO₂ + x wt% 2-PEMA systems were measured in changes of the pressure vs temperature (p - T) diagram, and with 2-PEMA weight fraction of 29.7, 35.1, 39.1, 44.5 and 52.2 wt%. To obtained of a vapor + liquid and liquid + liquid + vapor region, the P(2-PEMA) + CO₂ + 56.0 wt% 2-PEMA, P(2-PEMA) + CO₂ + 58.2 wt% PAe and P(2-PEMA) + CO₂ + 57.6 wt% 2-PEAe phase behavior curve bisects a supercritical fluid region → liquid + vapor curve at ~ 410 K and ~ 23 MPa (2-PEMA), ~ 365 K and ~14 MPa (PAe), and ~ 385 K and 18 MPa (2-PEAe), respectively.