

High pressure phase equilibria for the binary mixture of 2-phenyl butyronitrile and 3-phenyl propionitrile in supercritical carbon dioxide

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The solubility curves of binary mixture for 2-phenyl butyronitrile(2-PBN) and 3-phenyl propionitrile(3-PPN) in supercritical carbon dioxide are measured by static method at five temperatures (313.2, 333.2, 353.2, 373.2 and 393.2 K) and pressure up to 34.44 MPa. Both carbon dioxide + 2-PBN and carbon dioxide + 3-PPN systems have critical mixture curves that show maximums in pressure-temperature space between the critical temperatures of carbon dioxide and 2-PBN or 3-PPN. The solubility of carbon dioxide for two systems at a constant pressure decreases with the increase of temperature. The carbon dioxide + 2-PBN and carbon dioxide + 3-PPN systems exhibit type-I phase behavior. The experimental results for the carbon dioxide + 2-PBN and carbon dioxide + 3-PPN binary systems are correlated with Peng-Robinson equation of state using a mixing rule including two adjustable parameters (k_{ij} , n_{ij}).