

## High-Pressure Phase Behavior of Carbon Dioxide in Ionic Liquid: 1-Alkyl-3-Methylimidazolium bis(Trifluoromethylsulfonyl)imide

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In order to gain insight into the phase behavior of ionic liquids + supercritical fluids, the phase boundaries of a binary mixture of an ionic liquid and a supercritical fluid has been studied experimentally. High-pressure phase behavior of carbon dioxide in the ionic liquid 1-alkyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide ( $[C_n\text{-mim}][\text{Tf}_2\text{N}]$ ) are presented in a wide range of solution concentration at temperatures between 303 K to 343 K and at pressures up to 40 MPa. The equilibrium pressure at a given temperature and concentration were measured using a high-pressure apparatus equipped with a variable-volume cell. The equilibrium pressure increased very sharply with increasing concentration of  $\text{CO}_2$  in the ionic liquid-rich phase. The solubility of  $\text{CO}_2$  in the ionic liquid-rich phase decreased with an increase in temperature.