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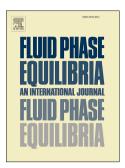
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Phase Behavior of Methane Hydrate in the Presence of Imidazolium Ionic

**Liquids and Their Mixtures** 

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**ABSTRACT** 

The phase equilibrium conditions of methane hydrate in single ionic liquid aqueous solutions containing low dosage

1-ethyl-3-methylimidazolium nitrate ([Emim][NO<sub>3</sub>]) at mass fractions of 0.01, 0.025, 0.05 are measured in a pressure

range of 3.50-15.0 MPa via an isochoric step-heating pressure search method. The thermodynamic inhibition effect of

mixed ionic liquids containing [Emim][NO<sub>3</sub>] in conjunction with 1-ethyl-3-methylimidazolium chloride ([Emim][Cl])

at low and high concentrations on methane hydrate formation is also investigated for the possible presence of

synergistic effects. It is observed that for all the inhibitor systems containing [Emim][NO<sub>3</sub>] or [Emim][Cl], the

inhibition effect increases progressively with the increased concentration and pressure. In addition, the mixture of

[Emim][NO<sub>3</sub>] and [Emim][Cl] does not always exhibit synergetic effect on the thermodynamic inhibition of

methane hydrate at higher concentrations up to 0.2 mass fraction. The higher concentrations are, the positive

interactions between [Emim][NO<sub>3</sub>] and [Emim][Cl] possibly happen at higher pressures.

KEYWORDS: phase equilibria, ionic liquid, synergetic effect, methane hydrate, inhibitor

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