

Sodium Chloride Aqueous Solution-Hydrate Equilibrium Measurements and Predictions of Hydrate Containing Phase Equilibrium for Methane and Ethane

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Clathrate hydrate is of importance as a future energy resource and as a problem to natural gas industry. Experimental equilibrium studies of hydrate containing systems have been mostly on three-phase equilibria and two-phase equilibria with guest-rich phase. Studies on water-rich phase in equilibrium with hydrates began recently in the absence of inhibitors. In the present study methane and ethane concentrations in water-rich phase in equilibrium with hydrates was measured by an indirect method in the present of sodium chloride at 10 – 15 MPa and 279 – 284 K. The solubility was found to decrease with addition of the electrolyte. For modeling aqueous solution and hydrate phase equilibria, a electrolyte lattice fluid equation of state was used. Using the parameters determined from electrolyte-free hydrate containing systems and hydrate-free electrolyte solutions, equilibria of hydrate containing systems with electrolytes were predicted.