

Experimental Measurements of Phase Equilibria and Formation Behaviors for Methane Hydrate containing Ethylene Glycol and Salts

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Here, phase equilibrium conditions and formation behaviors of methane hydrates containing mono-ethylene glycol(MEG) and various salts(sodium chloride, NaCl; sodium bromide, NaBr; sodium iodide, NaI) are investigated. Thermodynamic equilibrium conditions of methane hydrates with MEG and salts are measured in a temperature range of 272 – 283 K and a pressure range of 3.5 – 11 MPa. We can confirm the hydrate inhibition performance in the presence of additives, and the performance can be summarized as follows: methane hydrate in the presence of (5 wt% NaCl + 10 wt% MEG) > (5 wt% NaBr + 10 wt% MEG) > (5 wt% NaI + 10 wt% MEG). Formation behaviors of methane hydrates containing MEG and salts are investigated for analyzing the induction time, gas consumption amount and growth rate for various aqueous inhibitor solutions. As a result, there are no significant changes in the induction time during the methane hydrate formation in our experimental conditions. However, the addition of MEG and salts can affect the gas consumption amount and growth rate during the hydrate formation.