Spectroscopic Observation of Binary Clathrate Hydrates Formation in the presence of inhibitor

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Clathrate hydrates are non-stoichiometric crystalline compounds formed by physically stable interactions between water and small guest molecules. Recently, gas hydrates have received a great deal of attention because of the possible applications for natural gas storage, the source of natural gas and sequestration of CO2 in the deep ocean. However, in the petroleum industry, gas hydrate formed during production, transportation and processing could cause a blocking problem in oil pipelines. To prevent such a serious problem, thermodynamic inhibitors can be used, which can shift the hydrate equilibrium conditions to the inhibition region by lowering the activity of the aqueous water. In addition thermodynamic inhibitors, such as alcohols are found to be captured in hydrate cages when mixed with small help-gas molecules, such as CH4. In this study, we suggest a new thermodynamic inhibitor and we present spectroscopic results about tuning phenomenon of the gas hydrate in the presence of inhibitor as observed in the tuning system in the presence of hydrate promoter. Also hydrate phase equilibrium are reported for the binary clathrate hydrate system. However further investigations are necessary to explain molecular behaviors in the mechanism of hydrate inhibition and host-guest interaction.