

Phase Behavior and Tuning Composition of THF + CH₄ Double Hydrate

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Gas hydrates represent an attractive way of storing large quantities of gases such as methane, although to date there has been little effort to optimize the storage capacity and to understand the trade-offs between storage conditions and storage capacity. In this work, we present estimates for gas storage based on the ideal structures, and how these must be modified given the few available data on hydrate composition. Phase equilibrium data are used to map the region of stability of the double hydrate in P, T space as a function of the concentration of THF. In-situ high pressure NMR experiments were used to measure the kinetics of reaction between frozen THF solutions and methane gas, and MAS NMR experiments were used to measure the distribution of the guests over the cage sites.