

Tuning Phenomena Appearing in tert-Butyl Alcohol (TBA) + CH₄ Hydrate and Application to Gas Transportation

차민준, 박영준, 이 혼*

KAIST

(hlee@kaist.ac.kr*)

In the clathrate hydrate research, tuning and swapping phenomena are two important characteristics to understand inclusion chemistry. The tuning mechanism of the methane + THF or tert-butylamine clathrate hydrate was well investigated. It was understood that the empty cages can be used for gaseous guest molecules to exist by themselves, considering the possible interactions with the surrounding host and guest molecules. One of the monohydroxyl alcohol with a hydrophobic group, TBA appears to be fully miscible with water at any concentration and exhibits complex phase behavior. The TBA doesn't itself form a specific crystalline structure of clathrate hydrate with host water, but the inclusion of methane molecule in the solid phase of TBA-water forms the host lattice that can enclose both methane and TBA. In this study, we attempt to observe the tuning phenomena through ¹³C HPDEC NMR spectroscopy and we also identified critical guest concentration (CGC).