Structural Transition and Tuning of the *tert*-Butylamine Hydrate for Enhanced Methane Storage Capacity

김도연, 이 흔*
한국과학기술원 생명화학공학과
(h_lee@kaist.ac.kr*)

Although many researches are performing vividly for utilizing clathrate hydrates in the area of the gas transportation and storage, they are mainly focused on using water molecules as a lattice structure. In this study, we used *t*-$BuNH_2$ as host molecules to accommodate CH_4 guest molecules. The structural transition and the coexistence of structures according to the initial concentration of *t*-$BuNH_2$ are identified by means of powder X-ray diffraction (PXRD) and nuclear magnetic resonance (NMR), and the distributions of CH_4 molecules in cages of the double hydrates are also analyzed. These results lead us to think that the storage capacity of guest molecules can be tuned by using the structural transition. These microscopic results and the proposed tuning mechanism reported here can shed light on the future applications of the double hydrate in the area of the natural gas storage and transportation.