Occupation behavior of CO_2 and N_2O guests in hydroquinone clathrate cages

임솔거, 윤지호†
한국해양대학교
(jhyoon@kmou.ac.kr†)

Clathrates are crystalline inclusion compounds formed by interactions between host and guest molecules. The host molecule can be inorganic such as water known to form substances called gas hydrates and organic such as hydroquinone (HQ). They have garnered attention due to their high storage capacity for guest molecules and efficient separation ability from gas mixtures. Especially, using HQ clathrate, an efficient clathrate-based greenhouse gas separation (CBGS) technology is a recently used method for recovery of target greenhouse gases (GHGs). The objective of this study was to evaluate potential validity of using HQ clathrate formed from CO_2-N_2O gas mixtures for storage and recovery of GHGs. The crystal structure and guest enclathration were investigated using XRD, SEM, Raman spectroscopy, FT-IR, and solid-state NMR. The molecular ratio of host to guest in the CO_2 and N_2O HQ clathrate was presented as cage occupancy and gas storage. Selectivity measurements and Kinetics experiments indicate there is no preferential competition between CO_2 and N_2O compared to other gas mixtures or gases. This study will present a new direction for the development of advanced CBGS technology.