Spectroscopic Analysis and Guest Behaviors of Hydroquinone Clathrates Formed from Binary (N_2O+CO_2) Gas mixtures

임솔거, 윤지호†
해양과학기술대학원
(jihoyoon@kmou.ac.kr†)

Nitrous oxide (N_2O) is considered the third greenhouse gas after carbon dioxide (CO_2) and methane (CH_4). Especially, N_2O is a greenhouse gas around 300 times more efficient than CO_2. Recently, Hydroquinone (HQ) clathrates have been reported as a potentially good medium for storage and gas separation. In this study, the HQ clathrate samples were prepared from N_2O/CO_2 gas mixtures by the gas-phase synthesis method in a high-pressure cell. XRD, Raman spectroscopy, the solid-state ^{13}C CP/MAS NMR measurements were used to identify the crystal structure of the samples and guest enclathration into the clathrate framework. We investigated the gas storage capacity and cage occupancy of the HQ clathrate. For all clathrate samples, the individual gas storage amounts of HQ clathrate samples were estimated by gravimetric measurements and concentration measurements. We confirmed a structural transition from a-form to ß-form with all the HQ clathrates samples. This study presented it is useful to be aware of guest behaviors of HQ clathrates formed from binary (N_2O+CO_2) gas mixtures in order to extend the new technologies of storage and sieving of greenhouse gases through HQ.