

Effect of micro-sized geometrical constraint on swapping phenomena between CH₄ molecules in hydrate cages and CO₂+N₂ mixed gas molecules

김대옥, 이 혼*, 고동연, 이재형¹
한국과학기술원; ¹한국지질자원연구원
(hlee@kaist.ac.kr*)

In this study, we investigated the effect of geometrical constraints on swapping phenomenon. Lee et al, reported safe methane exploit method(1), To utilize this technique in industry, we need to collect data about kinetic phenomena of swapping reaction. Especially we focused on effect of pore size on kinetic behavior during swapping process. Silica gel, which is well known for highly porous material with pore diameter corresponding to mesopore range, was used as hydrate bearing sediments. Firstly pore of silica gel was saturated by vaporizing water in vacuum condition during at least 7days. Saturated silica gel was pressurized at moderate temperature and pressure condition by injecting CH₄ gas in high pressure cell. Exchange rate between CH₄ and CO₂ + N₂ molecules was measured by Gas Chromatography. Lots of studies have been preceded by oceanic, mechanic, chemistry, geology, and chemical engineers to develop methods for exploring and producing natural gas from deep sea reservoir. The present investigation may contribute to understanding the swapping phenomena and utilize this method to industrial use. (1) K. Shin; Y. Park; M. J. Cha; K. P. Park; D. G. Huh; J. Lee; S. J. Kim; H. Lee, Energy & Fuels 2008, 22, 5, 3160-3163