

Carbon dioxide and methane hydrate phase behavior in porous silica gels

강성필*, 류호정¹

한국에너지기술연구원 에너지정책연구부;

¹한국에너지기술연구원 에너지전환연구부

(spkang@kier.re.kr*)

Hydrate phase equilibria for the binary carbon dioxide+ water and methane+ water mixtures in silica gel pores of nominal diameters 6.0, 30.0, and 100.0 nm were measured and compared with the calculated results based on van der Waals and Platteeuw model. At a specific temperature, three phase HLV equilibrium curves for pore hydrates were shifted to the higher pressure condition depending on pore sizes when compared with those of bulk hydrates. Notably, hydrate phase equilibria for the case of 100.0 nominal pore size were nearly identical with those of bulk hydrates. The activities of water in porous silica gels were modified to account for capillary effect, and the calculation results were generally in good agreement with the experimental data. Physical properties such as enthalpy of dissociation and hydration number were also estimated from the data.