

Extremely high and rapid gas uptake in gas hydrates using surface modified silica sand

김광범, 사정훈^{1,†}

동아대학교; ¹동아대학교 화학공학과

(jhsa@dau.ac.kr[†])

Gas hydrate has attracted much attention as a clean energy and as an application material in various industrial fields using its unique physicochemical properties. The limitations so far are slow hydrate formation and low gas consumption, and thus various approaches have been proposed to solve these problems. Here, using a surface-modified silica sand, a fixed-bed reactor (FBR) system capable of deriving fast and excellent kinetics without any mechanical mixing and the use of chemical additives was applied. The results show that CO₂ hydrate formation kinetics using surface-modified silica sand bed was extremely fast with a large amount of gas uptake within only 1 h. CH₄ hydrate formation kinetics was also obtained with the same FBR system. Optimizing surface modification of silica sands can provide a novel solution for industrial gas hydrate-based processes such as energy storage/transportation and gas separation.