

CO and CO₂ Methanation over Promoted Nickel Catalysts Supported on Al@ γ -Al₂O₃LE THIEN AN¹, 김태욱¹, 김지은¹, 강종규¹, 박은덕^{1,2,†}¹아주대학교 에너지 시스템학부; ²아주대학교 화학공학과(edpark@ajou.ac.kr[†])

CO and CO₂ methanation known as the Sabatier reaction have been studied to develop the better catalysts and related processes. Ni-based catalysts have been widely used in the commercial process. Besides, the support with a high thermal conductivity has its merit as long as the high dispersion of metal is guaranteed to prevent the sintering phenomena by highly exothermic methanation reaction. The metal-ceramic core-shell microarchitectures can be a solution to enhance the thermal conduction of a support and dispersion of metal particles. The outstanding catalytic performance of the Ni catalysts supported on core-shell metal-ceramic microstructures (Al@ γ -Al₂O₃) on CO and CO₂ methanation offers a new catalyst design strategy. Moreover, adding some kinds of promoters was also investigated to enhance the catalytic performances. Mn can be selected as the effective promoter to enhance the catalytic activity. This is closely related to the Ni dispersion determined by H₂-chemisorption. On the other hand, the negative effect on CO methanation was observed over K⁻, Mg⁻, Zn⁻, and V-Ni/Al@ γ -Al₂O₃. The negative effect on CO₂ methanation was also found over V-Ni/Al@ γ -Al₂O₃.