

Propane CO₂ Dry reforming to synthesis gas over Ni/Al₂O₃ catalyst

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5w% of Ni catalysts supported on γ -Al₂O₃ were prepared and tested for catalytic CO₂ reforming of propane to synthesis gas reaction at 600°C. The prepared catalysts were characterized by XRD, FESEM, TEM, EDX dot-mapping, and BET analysis. According to XRD and TEM results, good interaction between active phase and support can be observed in Ni/ γ -Al₂O₃ catalysts. A uniform morphology, high surface area, and well dispersed particles of active sites in Ni/ γ -Al₂O₃. The activity measurements illustrated better Ni/ γ -Al₂O₃ catalyst activity in comparison to NiO/ γ -Al₂O₃ in terms of C₃H₈ and CO₂ conversion. H₂ and CO yield were higher for Ni/ γ -Al₂O₃ and higher H₂/Co ratio was obtained as well. Although Ni-based catalysts have been intensively employed in reforming reactions, they commonly suffer severe deactivation due to sintering of metal particles and carbon deposition. Coke formation and regeneration of deactivated catalysts were studied with the same reactor as used for the dry reforming. The prepared Ni/ γ -Al₂O₃ catalyst shows improved reactivity and stability compared to NiO/ γ -Al₂O₃.