

The effect of noble metal on the LDH Ni/MgAl catalysts in operation of LPG steam reforming

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The effects of noble metal addition on the activity and stability of layered double hydroxide (LDH) Ni/MgAl catalysts were investigated in the operation of LPG steam reforming at a temperature range of 600 ~ 850°C, feed molar ratio of H₂O/C = 1.0 ~ 3.0, space velocity of 20,000 h⁻¹ and atmospheric pressure. LDH Ni/MgAl hydrotalcite catalysts were prepared by a co-precipitation method and calcined to form Mg(Al,Ni)O periclase. The powders of periclase were dipped in aqueous solution of an noble metal chloride, dried at 110°C and calcined at 850°C for 5h. To compare with the activity, Ni/MgO and Ni/Al₂O₃ catalysts were prepared by an incipient wetness method. The characteristics of the fresh and used catalysts were analyzed by N₂ Physisorption, CO Chemisorption, XRD, SEM and TEM. The noble metal modified LDH Ni/MgAl catalyst showed higher molar ratio of H₂/CO than the other catalysts under the tested conditions.