

Hydrogen Production by Steam Reforming of Methane over M-Ni/MgAl₂O₄ Catalysts.

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Recently the search for alternative energy source for future is becoming one of the hot issues in the world. Hydrogen can play an important role in alternative energy fields. The Steam Reforming of Methane is a great way to produce hydrogen. Usually 1 mol of methane with water produces 3mols hydrogen and 1 mol of carbon monoxide. And by WGS reaction, carbon monoxide is altered to hydrogen.

In this study, we found the optimized reaction condition for both steam reforming and WGS reaction to raise the yield of hydrogen. M-Ni-based Hydrotalcite catalysts were developed for this experiment.(M = Cr, Fe) The catalysts were prepared by impregnation method and were characterized by various analysis machinery such as N₂ physisorption, TPR, CO₂-TPD, XRD, TGA and TEM/EDX techniques. Metal was well dispersed on the supported metal oxide after reduction and Cr promoted catalyst showed better catalytic activity than others. The catalytic performance for experiment was investigated in a 1/2 inch fixed-bed reactor with molar ratio of H₂O/CH₄ = 1.9~2.1, reaction temperature = 600~700 °C and reaction pressure of 1 bar.