Effect of Support composition on the performance of Rh-Mg/Al-CeOx catalyst for Methane Steam Reforming

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Steam reforming converts methane (and other hydrocarbons in natural gas) into hydrogen and carbon monoxide by reaction with steam. Rh-based catalysts have attracted increasing interest for developing coke-resistant reforming catalysts. In particular, composition of support was optimized in Rh-Mg/Al-CeOx catalyst to improve the volumetric productivity for methane conversion. The support was synthesized as a function of Al wt% of the catalysts via conventional precipitation method; Al 0, 2, 4, 7, 10, 20, 50 and 100 wt.%-CeOx.

Methane steam reforming activity in the presence of these catalysts was measured at 450, 500 ℃ with a steam/carbon ratio of 3.0 and SV 30,000 hr-1. Catalytic performance was enhanced in the activated catalysts, particularly Rh-Mg/Al[4]-CeOx was showed the highest methane conversion. The catalysts were characterized by X-ray diffraction spectroscopy, temperature-programmed reduction, temperature-programmed oxidation, N_2-BET and X-ray photoelectron spectrometer(XPS).