

Hydrogen Production via Steam Reforming of Methane Over Ni Supported Zeolite Catalysts

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Hydrogen stations can be made on-site instead of central production plants to reduce the costs by omitting the need for transportation and fuel storage. This approach requires the development of efficient and highly durable Ni based catalysts. Zeolites have showed physiochemical characteristics of zeolites like high surface area, consistent porosity and excellent adsorption capacity.

In this study, we have investigated the effect of cesium as a promoter for nickel supported zeolite Y. The catalysts were synthesized by the impregnation method. All catalysts were characterized by XRD, H₂-TPR, FTIR, and N₂-physisorption techniques. The catalytic performance for steam reforming of methane was carried out on a fixed bed reactor at 800 °C, 8 bar and GHSV of 35,000 h⁻¹. It was found that Ni/Y catalyst showed exemplary performance in steam condition compared to other zeolites. However, the catalytic activity for Zeolite Y is still lower than Ni-Al₂O₃ at severe reaction conditions. Cs-Ni/Y catalyst had shown great catalytic activity and durability. It is believed that the catalyst performance of Ni/Y can be further improved by the modification of support preparation method.