

Mesoporous Ni phyllosilicate hollow sphere catalysts for dry reforming of methane

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The dry reforming of methane (DRM; $\text{CO}_2 + \text{CH}_4 \rightarrow 2\text{CO} + 2\text{H}_2$) is attracting attention as a reaction to generate valuable synthesis gas using greenhouse gases, as an increase in concern for reduction and utilization of greenhouse gases. Nickel is most widely used as a catalyst for reforming, but the high reaction temperature of DRM causes aggregation of the catalysts and severe coke formation leading to deactivation. In this study, Ni phyllosilicate supported over spherical mesoporous SiO_2 prepared by hydrothermal method to prevent the sintering and coking. The synthesized catalytic properties were analyzed by X-ray diffraction (XRD), nitrogen adsorption and desorption isotherms, transmission electron microscopy (TEM), temperature programmed oxidation (TPO), and Raman spectroscopy.