

Methane reforming with carbon dioxide to synthesis gas over Mg-promoted Ni/HY catalyst

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Methane reforming with carbon dioxide to synthesis gas has attracted much attention recently. Numerous supported catalysts based on nickel and novel metals have been investigated for this reaction. One of the serious problems encountered in this reaction is the carbon deposition formed via Boudouard reaction ( $2\text{CO} \rightarrow \text{C} + \text{CO}_2$ ) or methane decomposition ( $\text{CH}_4 \rightarrow \text{C} + 2\text{H}_2$ ), which eventually leads to severe catalyst deactivation. High price of noble metals renders their application quite questionable. Therefore, it is more practical from the industrial point of view to develop an improved non-noble metal-based catalyst. That is, it is necessary to develop supported catalysts comprising non-noble metal and promoter showing considerable catalytic activity without suffering the catalyst deactivation by carbon deposition. In this study, we prepared the Ni/HY, Ni-Mn/HY, and Ni-Mg/HY catalysts and investigated their catalytic activity and stability in the methane reforming with carbon dioxide, with an aim of minimizing carbon deposition on the catalyst surface and improving catalyst stability and performance of the Ni/HY catalysts.