

고온고압 황내구성 WGS 반응 촉매

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The WGS reaction is one of the key catalytic stages in a fuel processor and hydrogen station. Since the reaction is an exothermic, the equilibrium conversion of CO is highest at low temperatures. Consequently a two-stage process is often used. In industrial reactors, Fe₃O₄-Cr₂O₃ catalyst was used for a high temperature shift (HTS) and Cu-Zn/Al₂O₃ catalyst was used for a low temperature shift (LTS) reaction. Existing commercial Cu-Zn/Al₂O₃ (LTS) catalyst, though highly active, was unsuitable for transportation applications because of their large size and weight, and the deactivation tendency of the copper-based catalysts under the severe conditions encountered in an automotive system. The Cu-Zn/Al₂O₃ catalyst also can not be used at temperatures above about 250°C, which further limits their utility. Therefore, the development of high performance WGS catalysts for integration with PEM fuel cells is very important.

In this work, we have studied the WGS reaction over Pt- and (or) Ni-containing cerium oxide catalysts. The thermal cycling performance over the prepared catalysts was compared with that over the commercial Cu-Zn/Al₂O₃ catalyst.