

Characterization and Testing of Copper Modified Catalysts for WGS Reaction

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The water gas shift (WGS) reaction is crucial in producing pure hydrogen. The commercial low temperature shift (LTS) catalyst (Cu-Zn/Al₂O₃), though highly active at low temperature, was unsuitable for commercialized applications because of the rapid deactivation tendency under severe conditions. Also, the Cu-Zn/Al₂O₃ catalyst can not be used at temperatures above about 250°C, which further limits their utility. The WGS reaction over ceria based catalysts was investigated to develop an alternate commercial Cu-Zn/Al₂O₃ catalyst.

A series of Cu modified ceria-zirconia mixed oxides was prepared, characterized, and tested for the WGS reaction. The catalyst was prepared by an impregnation method, and were characterized by N₂ physisorption, CO chemisorption and XRD. It was found that Cu/Ce_xZr_{1-x}O₂ catalyst showed higher activity and stability than the other catalyst for WGS reaction.