

Ordered mesoporous Cu-M-CeO<sub>2</sub> (M= Fe, Ni, Zn, W) as the catalysts for water-gas shift reaction

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The water-gas shift reaction (WGS) is an important reaction related to the fuel cell. The removal of CO, the by-product, is critical because it is adsorbed irreversibly onto the platinum electrode, hinders the electrochemical reaction. WGS reaction removes CO while producing additional H<sub>2</sub>. The industrial process for WGS is carried out in two steps: the high temperature shift (HTS, 350–450°C) reaction and the low temperature shift (LTS, 180–250°C) reaction. However, conventional catalysts are pyrophoric and normally require complicated activation steps. Hence, developing novel catalysts of WGS reaction have been carried out for years. In this study, we have designed ternary mixed oxide catalysts consisting of cerium oxide, copper, and another transition metal. Cu and CeO<sub>2</sub> are already well-known for considerable catalytic ability toward WGS reaction. For the additional transition metal, Fe, Ni, Zn, W had been used. According to the gas chromatography, the catalysts showed well catalytic performance toward WGS reaction. Further investigation of XRD patterns, nitrogen sorption, SEM, temperature programmed studies were carried out to characterize the synthesized catalysts.