Effects of metal promoters on mesoporous Fe_2O_3-ZrO_2 bimetal mixed oxides for CO and CO_2 hydrogenation

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Fischer-Tropsch Synthesis (FTS) is a heterogeneous catalytic process to produce eco-friendly fuels from the syngas containing CO or CO2. In our previous study, the highly ordered mesoporous ZrO2-promoted mesoporous Fe2O3¬ (m-FeZrOx) showed an increased catalytic activity through their enhanced structural stability. On the iron-based FTS catalysts, various promoters such as Cu and K can be utilized to increase the reducibility of the active components, and the product distribution can be affected by reaction conditions. In order to verify the effects of reaction variables on the m-FeZrOx with K promoter, powder X-ray diffraction (XRD), temperature-programmed reduction (H2-TPR), Brunauer-Emmett-Teller (BET) analysis, and X-ray Photoelectron Spectroscopy (XPS) were conducted.
Keywords: Fischer-Tropsch Synthesis; CO and CO2; mesoporous Fe2O3-ZrO2 bimetal mixed oxides; metal incorporation; structure stability; enhanced activity.