

Ordered mesoporous FeMO_x (M = Al or Zr) catalysts for high temperature Fischer–Tropsch synthesis

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Chemical conversion process of syngas to value-added clean fuels and chemical intermediates through high temperature Fischer–Tropsch synthesis (FTS) reaction was investigated using ordered mesoporous Fe₂O₃ with Al₂O₃ or ZrO₂ incorporation in the main frameworks. The improved structural stability with an irreducible metal oxides such as Al₂O₃ and ZrO₂ were mainly attributed to the strongly interacted Fe₂O₃ with irreducible metal oxides by forming mixed-metal oxides. The Al and Zr-incorporated Fe₂O₃ catalysts was synthesized by varying a molar ratio of Fe/Al or Fe/Zr using nano-casting replica method. In order to characterize the structural properties of the catalysts, powder X-ray diffraction (XRD), temperature-programmed reduction (H₂-TPR), Brunauer–Emmett–Teller (BET) analysis, and transmission electron microscopy (TEM) analyses were mainly performed.

Keywords: Fischer–Tropsch Synthesis(FTS); Mesoporous Fe₂O₃; irreducible ZrO₂ and Al₂O₃; structural stability.