Decreased CO production in methanol steam reforming over Cu/ZrO₂ catalysts prepared by the microemulsion technique

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Keywords: Zirconium oxide, microemulsion, in situ EXAFS, XPS, TPR, methanol steam reforming, CO formation, copper.
Abstract

Production of hydrogen by methanol steam reforming has been studied over a series of Cu/ZrO₂ catalysts prepared by the microemulsion technique. Catalytic activity was compared to that of a commercial Cu/ZnO catalyst. The synthesized catalysts have been characterized and investigated with respect to methanol conversion, CO formation, and long term stability. Both TPR and XANES/EXAFS indicate that two different Cu species are present in the as-prepared samples. The materials have BET surface areas of up to 165 m²/g. Characterization by XRD and TEM revealed that the Cu/ZrO₂ catalysts consist of tetragonal zirconia particles with a homogenous distribution of copper and zirconium in the material. Methanol steam reforming over these Cu/ZrO₂ materials results in substantially reduced CO formation at high methanol conversions compared to the commercial Cu/ZnO catalyst.