

Comparison of two preparation methods for the hybrid catalysts for DME steam reforming

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DME SR (Dimethyl ether steam reforming) for H₂ production generally proceeds in two steps, hydrolysis of DME to methanol and steam reforming of methanol. Acid catalysts are effective for hydrolyzing DME into methanol and copper oxides catalyze the methanol steam reforming. DME SR was investigated over the copper-based hybrid catalysts with acidic mesoporous silica. The hybrid catalysts were prepared by two different methods, one-pot synthesis (Cu-Al-SBA-15(10)) and physical mixing (Cu/Al-SBA-15(10)). The prepared catalysts were characterized with N₂-adsorption/desorption, XRD, NH₃-TPD, SEM and TEM. The Cu-Al-SBA-15(10) showed much smaller CuO crystallite (about 4.4 nm) and milder acidity than the Cu/Al-SBA-15(10), thereby showing higher catalytic activity and hydrogen yield in the DME SR reaction.