

Comparison of Methanol and Higher Alcohol Synthesis over Cu/ZnO/Al₂O₃ Catalyst

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Increasing concerns over reducing pollution and emission such as NO_x, CO, and unburned hydrocarbon in the exhaust, higher alcohol has been considered as gasoline additive for oxygenation of conventional fuel and for gasoline octane enhancer.

In this work, Cu/ZnO/Al₂O₃ catalysts were prepared under different pH conditions in co-precipitation step and the lithium were promoted on Cu/ZnO/Al₂O₃ catalysts via impregnation step. The purpose of this work is comparing Methanol Synthesis (MS) with Higher Alcohol Synthesis (HAS). All catalysts were characterized by N₂ physisorption, XRD, XRF, H₂-TPR/TPD. The reaction was carried out under the pressure of 45 bar, the GHSV of 4000 h⁻¹, the molar ratio of H₂/CO = 1, and the temperature of 240 °C for MS and 280 °C for HAS.

It was found that the catalyst with a large amount of malachite phase is favorable for methanol synthesis and the selectivity to higher alcohol was correlated with Cu surface area.