Synthesis, characterization and activity of modified Cu-ZnO based catalysts for methanol synthesis from syngas

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Methanol synthesis from syngas is play a vital role owing to the decreasing the oil price and consumption of fossile fuel, which are environmetaly harmful and depletion state. It was known that thermodynamic limitations and equilibrium conversions are the major problems in production of high yiled methanol from syngas. Cu based catalysts are employed in a wide range of commercial scale processes for methanol synthesis. The lifetime and deactivation behavior of these catalysts has drawn great attention with efforts to improve their activity and stability. In spite of the low-pressure methanol synthesis process, kinetics of the reaction and deactivation of $Cu/ZnO/Al_2O_3$ catalysts is still the discussion.

In this work, the Cu-ZnO catalyst modified with MgO, Al_2O_3 and $MgO-Al_2O_3$ supports were prepared by coprecipitation method. All catalysts have been employed for methanol synthesis form syngas under mild reaction conditions. The prepared catalysts before and after the reaction were characterized by XRD, TEM, N_2 physisorption, CO chemisorption, TPR and NH_3-TPD measurements.