

Application of Cobalt based catalyst supported Hollow spherical mesoporous silica for Fischer-Tropsch synthesis

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The Cobalt-based catalysts supported on hollow spherical mesoporous silica (Co/HSMS) were prepared for Fischer-Tropsch Synthesis (FTS) and characterized by N₂-physisorption, TPR, TPD, XRD, SEM and TEM. The performance of these catalysts for FTS were tested in a fixed bed reactor under the conditions 240°C, 2.5MPa, H₂/CO feed molar ratio of 2.0 for 100 h. The dependence of crystallite size and reducibility of Co₃O₄ on the supports were investigated with FTS activity, CO and H₂ conversion, liquid fuel selectivity and product distribution in a fixed bed reactor system. The Co/HSMS showed higher FTS activity than Co-based catalyst supported on commercial silica gel. It was found that the cobalt particles on Co/HSMS smaller than commercial silica supported one. Finally, there was almost no loose of cobalt metal on the hollow spherical silica supported catalyst during the FTS.