

Deep Oxidative Desulfurization of Dibenzothiophene Catalyzed by Mesoporous Tungsten Oxide

이정화, 김명실, 김지만*
성균관대학교
(jimankim@skku.edu*)

In this paper, a series of mesoporous metal oxides (Co_3O_4 , Fe_2O_3 , TiO_2 , MoO_2 , WO_3 , CuO) were synthesized by replication method using mesoporous silica KIT-6 as hard template. The obtained materials were well-characterized by XRD, N_2 -sorption, SEM and used as catalysts for the removal of benzothiophene (BT), dibenzothiophene (DBT), and 4,6-dimethyldibenzothiophene (4,6-DMDBT) from the model oil. The results showed that the catalytic activity was decreased in the order: $\text{WO}_3 > \text{TiO}_2 > \text{MoO}_2 > \text{Fe}_2\text{O}_3 \geq \text{Co}_3\text{O}_4 > \text{CuO}$. Therefore, mesoporous WO_3 was used for catalytic oxidation of sulfur-containing molecules in model oil was detail under different reaction conditions (including different desulfurization systems, $\text{H}_2\text{O}_2/\text{DBT}$ molar ratio, temperature and various sulfur compounds). Moreover, oxidative desulfurization system could be recycled for several times without significant decrease in activity by using mesoporous WO_3 as catalyst.