

Effect of Highly Ordered Mesoporous WO₃/KIT-6 Catalyst for Oxidative Desulfurization of Fuel Oil

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Mesoporous KIT-6 supported WO₃ catalysts (with various WO₃ loadings of 5, 10, 15 and 20wt%) were synthesized by incipient impregnation method and used as the catalysts for oxidative desulfurization of model oil. The materials were well-characterized by X-ray diffraction (XRD), N₂-adsorption, Scanning electron microscope (SEM), Transmission electron microscopy (TEM), H₂-TPR and Raman spectroscopy. The results show that the WO₃/KIT-6 catalyst with a WO₃ content up to 10wt% can well dispersed on the support of mesoporous KIT-6, and from 15wt%, crystalline WO₃ was generated. The application of these catalysts to the oxidative desulfurization (ODS) of aromatic sulfur compounds (dibenzothiophene, 4,6-dimethyldibenzothiophene, benzothiophene) with H₂O₂ was reported. The effects of reaction temperature, catalyst amount, and H₂O₂/S ratio on the desulfurization of DBT over 10wt% WO₃/KIT-6 were studied in detail. And when the temperature increased to 70°C, treatment of BT, DBT, 4,6-DMDBT with 10wt% WO₃/KIT-6 showed 100% removal of sulfur compounds in 2h. In addition, the catalyst could be recycled several times with only a slight reduction in catalytic activity after regenerated by calcination.