Tungsten-promoted SnO$_2$ with highly ordered mesostructure as an efficient catalyst for deep oxidative desulfurization

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Oxidative desulfurization of model oil has been studied using mesoporous WO$_3$/SnO$_2$ as catalyst. A series of WO$_3$/SnO$_2$ catalysts were prepared by loading WO$_3$ (10 wt% ~ 30 wt%) on mesoporous SnO$_2$ materials through wet impregnation method. The catalytic activity of samples was tested by oxidative desulfurization of DBT (dibenzothiophene) from model oil with H$_2$O$_2$ as the oxidant. The result showed that the catalytic activity of samples was improved with increasing the content of WO3 from 10 wt% to 20 wt% and decreased by further addition. And among all the catalysts, 20 wt% WO$_3$/SnO$_2$ exhibited the highest activity, due to the amount of active W species were more than other samples, which could exhibited the WO$_3$ ($\leq$ 20 wt%) was highly dispersed on the surface of mesoporous SnO$_2$ and the the strong interaction between WO$_3$ and SnO$_2$. Additionally, there was no decrease in activity of the used catalyst after 5 times recycle-test which indicated the reusability of catalyst.