# Preparation and characterization of mesoporous spherical $TiO_2$ supported $WO_x$ as a catalyst for the oxidative desulfurization of dibenzothiophene

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A series of $WO_x/TiO_2$ catalysts with different WOx loadings (5 – 20 wt%) were prepared by a wet-impregnation method. The synthesized samples were characterized using various physicochemical characterization techniques, such as X-ray diffraction, nitrogen adsorption-desorption, scanning electron microscopy, and Raman spectroscopy. Catalytic performance of all the catalysts was evaluated in oxidative desulfurization of model oil under very mild conditions of atmospheric pressure and 50 °C in a biphasic system using hydrogen peroxide as an oxidant and acetonitrile as an extraction solvent. Excellent catalytic activity for the removal of the sulphur-containing compounds from the model oil was observed with 20 wt% $WO_x/TiO_2$ catalyst, mainly due to the porosity associated with the $TiO_2$ support, fine dispersed active tungsten oxide species on the mesoporous $TiO_2$ support, and strong interaction between the $WO_x$ and the $TiO_2$ surface. Moreover, deprived of undertaking any regeneration steps, the catalyst can be recycled more than five times without losing its catalytic activity.