

Green solvent free epoxidation of olefins by a heterogenised hydrazone-dioxidotungsten(VI) coordination compound

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Streszczenie

A new mononuclear tungsten coordination compound, $[\text{WO}_2\text{L}(\text{CH}_3\text{OH})]$ (**1**), was synthesized by the reaction of WCl_6 and H_2L ($\text{H}_2\text{L} = (E)\text{-4-amino-}N'\text{-(5-bromo-2-hydroxybenzylidene)benzohydrazide}$) in methanol. Both the H_2L and compound **1** were characterized by elemental analysis and UV-Vis, FT-IR and NMR spectroscopic methods. The molecular structure of compound **1** was also determined by single crystal X-ray analysis which confirmed the compound is a mononuclear coordination compound of *cis*-dioxidotungsten(VI) containing a free amine functionality on the ligand. Compound **1** was supported on propionyl chloride-functionalized silica gel by amidification reaction to obtain a heterogeneous catalyst. The obtained heterogeneous catalyst was characterized by FT-IR spectroscopy, thermal gravimetric analysis (TGA), diffuse-reflectance spectroscopy (DRS), X-ray diffraction analysis (XRD), energy-dispersive X-ray spectroscopy (EDX), X-ray photoelectron spectroscopy (XPS) and scanning electron microscopy (SEM) and its catalytic activity was investigated in the epoxidation of olefins with hydrogen peroxide under solvent free conditions. The catalyst was successfully recovered several times and the recovered catalyst was also characterized by various methods including FT-IR, DRS, TGA, SEM and EDX analyses. The results indicated this heterogeneous catalytic system is an effective and selective catalyst for epoxidation of olefins and can be reused several times without significant change in its catalytic activity.

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