Molybdenum(VI) Dioxo Complexes Supported on stable Ring-type Periodic Mesoporous Organosilicas

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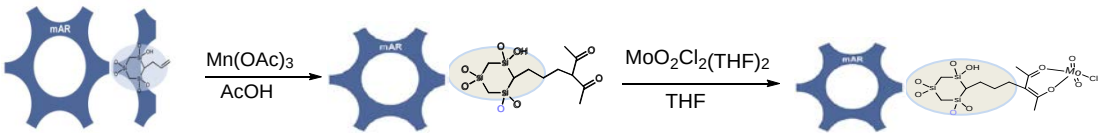
In the past decades, high-valence oxomolybdenum complexes have proven to be excellent catalysts for the reduction and oxidation of organic compounds [1-3] but can also act as a Lewis acid [4]. We report the synthesis of a heterogeneous molybdenum dioxo-catalyst with high selective catalytic performance, by grafting a molecular molybdenum dioxo-precursor onto a Periodic Mesoporous Organosilica (PMO) (Scheme).

A 100% monoallyl ring-type PMO [5] was functionalized with acetylacetone via a radical reaction. A molybdenum dioxo complex, using the solvent adduct $[MoO_2Cl_2(THF)_2]$ was then immobilized on the allyl bearing PMO material in order to prepare a new molybdenum (VI) based heterogenous catalyst. Structural analyses by X-ray powder diffraction, nitrogen sorption and transmission electron microscopy showed an ordered mesostructure while characterization by infrared and X-ray photoelectron spectroscopy demonstrated molybdenum (VI) active centers supported on the PMO material. The catalytic activity of the supported catalyst was tested in the aerobic oxidation of 5-hydroxymethylfurfural (HMF).



mAR mAR-acac MoO_2Cl_2@mAR-acac

Scheme Schematic representation of the anchoring of $MoO_2Cl_2(THF)_2$ onto the monoallyl ring PMO.

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