Graphene oxide supported oxidovanadium coordination compound as an efficient catalyst for the green oxidation of benzyl alcohol

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Streszczenie

In this research, a green method for the oxidation of benzyl alcohol to its oxidized products has been reported. Firstly, (*E*)-4-amino-*N*'-(phenyl(pyridin-2-yl)methylene)benzohydrazide (HL) as an NNO-donor ligand was synthesized by the reaction of 2-benzoylpyridine and 4-aminobenzohydrazide in a molar ratio of 1:1 under reflux condition. HL was used for the synthesis of a V(V) coordination compound, $[VO(\mu\text{-}O)L]_2$, through its reaction with NH_4VO_3 in methanol under reflux condition and the orange crystals of dinuclear oxidovanadium(V) coordination compound, $[VO(\mu\text{-}O)L]_2$, were obtained by partial evaporation of the solvent during four days. HL and $[VO(\mu\text{-}O)L]_2$ were characterized by spectroscopic methods and the structure of $[VO(\mu\text{-}O)L]_2$ was determined by single crystal X-ray analysis which showed that it is a neutral binuclear oxidovanadium(V) coordination compound and is crystallized in triclinic system (*P-1* space group). In the unit cell there are two kinds of independent centrosymmetric dinuclear $[VO(\mu\text{-}O)L]_2$ molecules and the V(V) ions in both molecules are six coordinated. Due to the presence of free amine functional group in the structure, $[VO(\mu\text{-}O)L]_2$ was supported on the surface of graphene oxide, and a heterogeneous catalyst (**GO-V**) was provided. **GO-V** was characterized by FT-IR, UV-DRS, TGA, XRD, FE-SEM, EDX/map and BET analyses. The obtained heterogeneous catalyst was used in the oxidation of benzyl alcohol, and during this process, the effect of influencing parameters was investigated. The catalyst was recovered after the catalytic process and characterized by FT-IR, XRD, FE-SEM and EDX/map analyses. The results indicated that **GO-V** has high stability and activity in the catalytic conversion of benzyl alcohol to its oxidized products.

Słowa kluczowe

NNO-donor ligand, Dinuclear V(V) coordination compound, Heterogeneous catalyst, Graphene oxide, Supported catalyst, Oxidation of alcohol, Catalyst synthesis, Heterogeneous catalysis

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