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研究论文

Heterogeneization of [Cu(2,2'-bpy)Cl2] and [Cu(1,10-phen)Cl2] on Polyoxometalates: New Catalysts for the Selective Oxidation of Tetralin

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摘要 Mononuclear Cu(II) bipyridine (1) and phenantroline complexes (2) were synthesized and immobilized by different procedures on $H_3PW_{12}O_{40}$ polyoxometalate (POM). Characterization by XRD and SEM-EDX were performed to assess the preservation of the Keggin structure and stoichiometry of the complex. The immobilized complexes were tested as heterogeneous catalysts for the partial oxidation of tetralin (1,2,3,4-tetrahydronaphthalene) using hydrogen peroxide as oxidant in acetonitrile/water as solvent. [Cu(2,2'-bpy)Cl][$H_2PW_{12}O_{40}$] and [Cu(1,10-phen)Cl][$H_2PW_{12}O_{40}$] oxidized tetralin at room temperature, with 16% conversion with (2), to 1-tetralone and 2-tetralone with 83% selectivity. However, the selectivity for 1-tetralone was only 56%. Different preparation methods for the heterogenization of these complexes on the POM Keggin unit were compared and used to enhance the selectivity to 1-tetralone to 75%.

关键词： tetralin partial oxidation Cu(II) complexes 2,2'-bipyridine 1,10-phenantroline hydrogen peroxide polyoxometalate

Abstract： Mononuclear Cu(II) bipyridine (1) and phenantroline complexes (2) were synthesized and immobilized by different procedures on $H_3PW_{12}O_{40}$ polyoxometalate (POM). Characterization by XRD and SEM-EDX were performed to assess the preservation of the Keggin structure and stoichiometry of the complex. The immobilized complexes were tested as heterogeneous catalysts for the partial oxidation of tetralin (1,2,3,4-tetrahydronaphthalene) using hydrogen peroxide as oxidant in acetonitrile/water as solvent. [Cu(2,2'-bpy)Cl][$H_2PW_{12}O_{40}$] and [Cu(1,10-phen)Cl][$H_2PW_{12}O_{40}$] oxidized tetralin at room temperature, with 16% conversion with (2), to 1-tetralone and 2-tetralone with 83% selectivity. However, the selectivity for 1-tetralone was only 56%. Different preparation methods for the heterogenization of these complexes on the POM Keggin unit were compared and used to enhance the selectivity to 1-tetralone to 75%.

Keywords： tetralin, partial oxidation, Cu(II) complexes, 2,2'-bipyridine, 1,10-phenantroline, hydrogen peroxide, polyoxometalate

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