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Title: Synthesis and Characterization of a New Copper Complex with Oxime Ligand as a Catalyst for Alcohol Oxidation.

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Oximes are a significant class of bioactive organic compounds that possess a functional group consisting of an imine connected to a hydroxylamine (C=N-OH) group. The amphoteric nature of the oxime functional group arises from a slightly basic nitrogen atom in the imine group and a slightly acidic hydroxyl group, giving rise to excellent ligands for coordination chemistry [1]. Copper is a crucial metal in mineral and complex chemistry and is widely used as a catalyst in many chemical reactions due to its unique properties, including stability under different conditions, catalytic activity in oxidation and reduction reactions, and antibacterial and antifungal properties. Copper complexes based on oxygen-containing ligands are particularly advantageous for these applications [2,3]. In this work, a new copper complex was synthesized by the reaction of copper nitrate trihydrate with an oxime ligand in methanol solvent. The obtained complex was characterized by spectroscopic methods and its structure was determined by single crystal X-ray analysis. SC-X-ray analysis idnicated that the obtained compound is a mononuclear copper complex with general formula of $[Cu(L)_2(NO_3)_2]$ (where L is (*Z*)-2-amino-N'-hydroxybenzimidamide). $[Cu(L)_2(NO_3)_2]$ is crystallized in the Triclinic *P-1* space group, exhibiting octahedral geometry around the copper ion and z-out Jan-Teller distortion can be clealy obsereved in the axial positions. This complex was used as a catalyst for the oxidation of benzyl alcohols by using H_2O_2 as an oxidant. The catalytic reactions were carried out under air condition and the results indicated the synthesized copper complex has high catalytic activity in the oxidation of benzyl alcohol. The electronic effects of the substituents in the catalytic process were studied, concluding that strong electron-withdrawing groups indeed facilitate the catalytic reaction.

Keywords: Copper, Catalyst, Complex, Oxime, Ligand

References

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