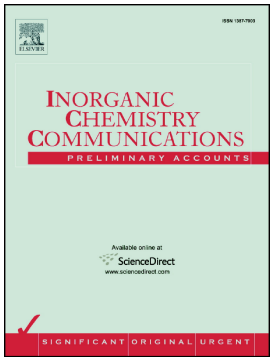

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Copper(II) complex of the 2-pyridinecarbaldehyde aminoguanidine Schiff base: Crystal structure and catalytic behaviour in mild oxidation of alkanes

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Keywords: 2-Pyridinecarbaldehyde; Aminoguanidine; Schiff base copper(II) complex; Crystal structure; Catalytic oxidation of cyclohexane, adamantane, *cis*-1,2-dimethylcyclohexane

Abstract

The new neutral dichloro-copper(II) Schiff base complex $[CuCl_2L]\cdot dmf$ **2**, where L results from condensation of 2-pyridinecarbaldehyde and aminoguanidine, was prepared, while the ligand itself was isolated in its protonated form as the dinitrate salt $(H_2L)(NO_3)_2$ **1**. Extended conjugation is responsible for the planarity of the H_2L^{2+} cation in **1**. On coordination, L forms two fused 5-membered chelate rings occupying three equatorial positions of the distorted square pyramidal copper polyhedron in **2**. The catalytic investigations disclosed a prominent activity of the copper compound **2** towards oxidation of cyclohexane with hydrogen peroxide in the presence of various promoters (nitric and acetic acids, pyridine and pyrrole), showing overall yields of products (cyclohexanol and cyclohexanone) up to 21 % based on the substrate.

The guanidine group is widely spread in biological molecules and has been of much interest in the field of natural product synthesis [1, 2] and drug development [3, 4]. Due to its unique role as a hydrogen-bond donor and its positive charge (upon protonation) the guanidine group is of importance for molecular recognition in chemical and biological systems [5, 6]. The utilization of guanidine derivatives as catalysts and superbases has also been explored [7–9]. Aminoguanidine (AG) has been extensively studied for the treatment of diabetic complications [10]. It is also one of the most studied quenchers of reactive carbonyl species (RCS) - endogenous or exogenous byproducts involved in the pathogenic mechanisms of different oxidative-based disorders [11]. Detoxification of RCS by carbonyl quenchers is a promising therapeutic strategy and investigation