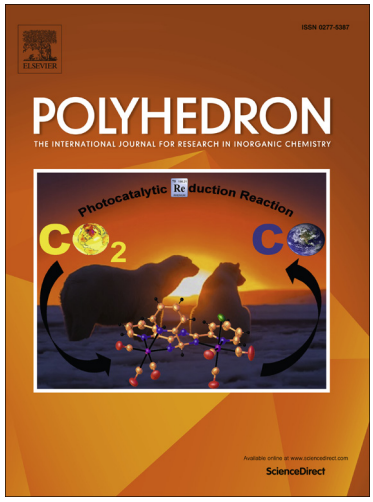

TEMPO-mediated Aerobic Oxidation of Alcohols using Copper(II) Complex of Bis(phenol) di-amine Ligand as Biomimetic model for Galactose oxidase Enzyme

Elham Safaei, Leila Hajikhanmirzaei, Babak Karimi, Andrzej Wojtczak, Patricia Cotič, Yong Lee

PII: S0277-5387(15)00660-9
DOI: http://dx.doi.org/10.1016/j.poly.2015.11.003
Reference: POLY 11647

To appear in: *Polyhedron*

Received Date: 16 June 2015
Accepted Date: 4 November 2015

Please cite this article as: E. Safaei, L. Hajikhanmirzaei, B. Karimi, A. Wojtczak, P. Cotič, Y. Lee, TEMPO-mediated Aerobic Oxidation of Alcohols using Copper(II) Complex of Bis(phenol) di-amine Ligand as Biomimetic model for Galactose oxidase Enzyme, *Polyhedron* (2015), doi: http://dx.doi.org/10.1016/j.poly.2015.11.003

TEMPO-mediated Aerobic Oxidation of Alcohols using Copper(II) Complex of Bis(phenol) di-amine Ligand as Biomimetic model for Galactose oxidase Enzyme

Elham Safaei*[a,b], Leila Hajikhanmirzaei[b], Babak Karimi[b],
Andrzej Wojtczak[c], Patricia Cotič[d], Yong Lee[e]
[a]Department of Chemistry, College of Sciences, Shiraz University, Shiraz, 71454, Iran
[b]Institute for Advanced Studies in Basic Sciences (IASBS), 45137-66731, Zanjan, Iran
[c]Nicolaus Copernicus University, Department of Chemistry, 87-100, Torun, Poland
[d]Institute of Mathematics, Physics and Mechanics, Jadranska 19. SI-1000, Ljubljana, Slovenia
[e]Department of Chemistry, Changwon National University, Changwon 641-773, South Korea

Correspondence to: Elham Safaei
E-mail:safaei@iasbs.ac.ir

Abstract

Mononuclear copper complexes of four-dentate N_2O_2 bis(phenol) diamine ligands (H_2L^{NEX} X: C and OB in which C and OB are chloro and *tert*-butyl- methoxy substituents on phenol groups) have been synthesized and characterized by IR, UV-Vis, single crystal X-ray diffraction, magnetic susceptibility studies and cyclic voltammetry techniques. The CuL^{NEX} complexes show the square pyramid geometry of the coordination sphere with the copper centres surrounded by two nitrogen and oxygen atoms from the coordinating ligand and an axially bound water molecule. The effective magnetic moments of 1.7 and 1.8 B.M confirm a monomer complex with copper(II) center. Electrochemical oxidation of these complexes yielded the corresponding Cu(II)–phenoxyl radical species. In addition, CuL^{NEX} complexes, have shown efficient catalytic activities for TEMPO–mediated oxidation of a set of alcohols to the corresponding aldehydes in the presence of molecular oxygen as oxidant at room temperature.

Keywords: GOase; Biomimetic copper complexes; Phenoxyl radical; Alcohol oxidation; TEMPO.