



Electrochemical and Spectral Behaviour of Binary and Mixed-Ligand Copper (II) Complexes of Dicyanamide and Pyrazine in Non-Aqueous Solvents

Rachana Shukla, Krishna Srivastava* and Jagdish Prasad

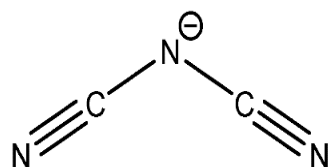
Nanoscience and Electrochemical Research Laboratory, Department of Chemistry,
University of Allahabad, Allahabad-211002 (U. P.), **INDIA**
Email: dr_krishna_s@yahoo.co.in, rshuklachemau@gmail.com

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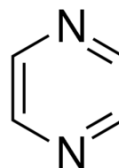
ABSTRACT

The binary copper (II) complex with dicyanamide and mixed ligand copper (II) complex involving dicyanamide and pyrazine were synthesized and characterized by elemental analyses (C,H,N), UV-Visible and FT-IR spectra. The electrochemical behaviour of these complexes were studied in dimethylformamide (DMF) and dimethylsulfoxide (DMSO) containing 0.1M tetrabutylammonium perchlorate (TBAP) as supporting electrolyte at a glassy carbon disc working electrode using cyclic voltammetry. The cyclic voltammograms of binary and mixed ligand complexes in DMF and DMSO showed a quasireversible redox couple corresponding to $\text{Cu}^{2+}/\text{Cu}^+$ with formal potentials $E^{0'} = 263$ mV, $E^{0'} = 285$ mV, $E^{0'} = 175$ mV and $E^{0'} = 166$ mV against Ag/AgCl. The cathodic peak potential shifts negatively and anodic peak potential shifts positively with increasing scan rate and the plot of cathodic peak current (I_{pc}) vs square root of scan rate ($v^{1/2}$) gave a straight line passing through origin, inferring that the reduction process is diffusion-controlled. The UV-Visible spectra of the binary and mixed ligand complexes in DMF and DMSO were also studied.

Graphical abstract



Dicyanamide



Pyrazine

Keywords: Methyl orange, Iron nanoparticles, UV-Visible Spectroscopy, Rate Constant.