



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

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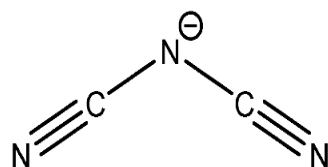
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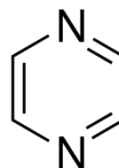
ABSTRACT

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 quasi reversible redox couple corresponding to $\text{Cu}^{2+}/\text{Cu}^+$ with formal potentials $E^{\circ} = 263$ mV, $E^{\circ} = 285$ mV, $E^{\circ} = 175$ mV and $E^{\circ} = 166$ 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.