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Electrochemical and Spectral Behaviour of Binary And Mixed Ligand Copper (II) Complexes Involving Various Pyridinedicarboxylic Acids and 2,9-Dimethyl-1,10-Phenanthroline in Dimethylsulfoxide

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ABSTRACT

The Electrochemical studies of binary copper (II) complexes with six pyridinedicarboxylic acids (pdcs), viz; 2,3-pdc (A), 2,4-pdc (B), 2,5-pdc (C), 2,6-pdc (D), 3,4-pdc (E) and 3,5-pdc (F) in 3:1 metal to ligand molar ratio and the mixed-ligand copper(II) complexes with six pdcs and dmp (2,9-dimethyl-1,10-phenanthroline), where pdcs = 2,3-pdc 1; 2,4-pdc 2; 2,5-pdc 3; 2,6-pdc 4; 3,4-pdc 5 and 3,5-pdc 6 were made in 3:1:1 metal to ligand molar ratio in dimethylsulfoxide (DMSO) containing 0.2 M sodium perchlorate ($NaClO_4$) as the supporting electrolyte at a glassy carbon disc working electrode using cyclic voltammetry. It should be mentioned that in all the binary complexes a single quasireversible redox couple ($Cu^{2+/+}$) is obtained at the scan rate of 25 mV/s. On the other hand the mixed-ligand complexes in 3:1:1 Cu (II): pdcs: dmp metal to ligand molar ratios was involved one irreversible redox process and a second quasireversible couple at the scan rate of 25 mV/s. The UV-visible electronic spectra of the binary complexes in dimethylsulfoxide exhibit only a single broad d-d absorption band at 810, 803, 825, 818, 845 and 842 nm, respectively, clearly indicating a distorted octahedral geometry. The UV-visible spectra of all the mixed-ligand complexes were also studied in respective medium.

Keywords: Binary and mixed-ligand Cu (II) complexes, pyridinedicarboxylic acids, cyclic voltammetry, UV- Visible Spectra.
