ABSTRACT

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Title: Studies in Chemistry of Some Novel Copper Complexes

The main purpose of this present thesis work is to explore the chemistry of copper in its two oxidation states, +I and +II. Copper, the last of the first-row transition elements of Group 11, bears a truly vast chemistry. Specifically, the target here is to expound the chemistry of copper(II) from biological perspectives like studies of bio-macromolecular interaction (DNA and RNA), inhibition of digestive enzymes and anticancer activity. Another target is to examine the magnetic properties of some polynuclear copper(II) complexes. The thesis comprises seven chapters. Chapter I deals with a short literature survey pertaining to the research work undertaken in the course of present investigation. With this brief overview; the aim, objective and scope of the present studies is delineated herewith. The DNA and RNA binding propensities of a bromo-bridged copper(II) dimer, stabilised from a Schiff base ligand, have been highlighted in chapter II. In chapter III, a naphthaldehyde based Schiff base ligand and its mononuclear copper(II) complex have been studied for inhibition of various digestive enzymes. The ligand has also been employed for selective sensing of copper(II) ion. In chapter IV, studies on magnetic interaction of two 1D coordination polymers of copper(II), prepared from a morpholine based Schiff base ligand, have been of prime interest. The *in vitro* anticancer activities of two mononuclear copper(II) complexes, derived from a morpholine based Schiff base ligand, against lung cancer cell lines (A549) have been discussed in chapter V. Chapter VI is concerned with an oxime based Schiff base ligand and its hydroxo-bridged trinuclear copper(II) complex. This complex has also been screened against lung cancer cell lines (A549). The magnetic properties of this complex have also been studied. Lastly, syntheses, characterization and electrochemical melanin sensing aspects of two mononuclear copper(I) complexes, stabilised from a quinoxaline based ligand, have been forwarded in chapter VII.

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Signature of the Candidate

Jnan Prakash Naskar

Signature of the Supervisor

29.07.24

DR. JNAN PRAKASH NASKAR
Professor of Chemistry
Jadavpur University
Kolkata-700 032