

Preface

The studies on coordination chemistry of aldimine derivatives of amino acids have constituted an important line of departure in the development of bioinorganic chemistry; they are relevant to a diverse series of reactions in amino acid metabolism⁴⁻⁶. They also occupy the centre stage of research on reactions of coordinated ligands^{5,6}. H.E. Smith and coworkers have developed the salicylideneamino chirality rule for establishment of the absolute configurations/ conformations of a whole range of chiral primary amines including α -amino acids, by CD spectroscopy¹. NMR studies on conformation analysis of pyridoxal Schiff bases of α -amino acids, have been the subject of attention of C.J.Cheng and his group². The present research work embodies the effort for correlating the CD and NMR spectral data of the aldimine derivatives of amino acids, using the diamagnetic UO_2^{2+} entity as a chiroptical probe. The recent impressive growth of literature on synthetic and physico-chemical studies on

coordination compounds of dioxouranium(VI), stands as a testament to the importance of this dioxocation, as a centre of coordination^{12,45-49,68-71,106,147-149,224-228}. Attention has also been focussed on coordination compounds of molybdenum with such ligands, for understanding their CD spectral data vis-a-vis those of oxo-type molybdoenzymes. The last couple of decades have witnessed the identification of more than twelve molybdoenzymes, which are important for catalyses within the metabolic cycles of carbon, nitrogen, sulfur and chlorine; powerful physical techniques like EXAFS, EPR, Mössbauer, ENDOR, CD and MCD spectroscopy have been employed for their characterization. The biological studies have spurred much fruitful synthetic and mechanistic work in inorganic chemistry, aimed at elucidating the means whereby Nature achieves its stereochemical ends. In short, the biochemical and biomimetic studies on molybdoenzymes, represent an emerging intellectual field^{101,121,122,137,164,169-178,182-184,194-196,206-210,214,220,230-234}.

Cyclic voltammetric studies form an integral part of this work; they help to monitor the electrochemical responses of the new coordination compounds, in the light of their configurational/conformational properties. Electronic-conformational interactions are of prime importance for understanding the electron transfer reactions of redox metalloenzymes^{75,77,138,176,203}.

This research work has been carried out in the laboratory of Dr. P.S.Roy, Department of Chemistry, North Bengal University.

This treatise is divided into five chapters; they are devoted to the synthetic and physico-chemical studies on coordination compounds of dioxouranium(VI) and oxo/sulfido bridged molybdenum(V,VI) cores, with the ligands mentioned under title. In each chapter, tables and figures have been numbered using a combination of Roman and Arabic numerals; for example, the first table of chapter I is numbered I-1, the second table is numbered I-2, whereas the first table of chapter II is numbered II-1, the second table as II-2 and so on. References have been indicated by superscript numbers throughout the text and collected together at the end of this thesis.

Preliminary report on one portion of this work has been presented at the Group Monitoring Workshop of Department of Science and Technology, New Delhi, funded projects held at the Indian Institute of Science, Bangalore, Feb 23-24, 1991. Another part of this work has been presented at the 4th Symposium on Modern Trends in Inorganic Chemistry held at the Central Salt and Marine Chemicals Research Institute, Bhavnagar, Oct 21-23, 1991. A part of the materials of chapter III has been published in Transition Metal Chemistry (1987). Other portions of this work are presently being communicated to different international journals.


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