

Dedicated
to
my beloved Parents

DECLARATION

I hereby declare that the thesis entitled “**Design, Structural Characterization and Bio-inspired Catalysis of some Coordination Compounds Containing Polydentate Chelators**” submitted for the award of Ph.D. Degree, is the result of investigations carried out by me at Department Chemistry, University of North Bengal under the guidance of Professor Bhaskar Biswas and further that it has not previously formed the basis for the award of any other degree.

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I declare that **Mr. PRFULLYA KUMAR MUDI** has prepared the thesis entitled “**Design, Structural Characterization and Bio-inspired Catalysis of some Coordination Compounds Containing Polydentate Chelators**” for the award of Ph.D. degree of University of North Bengal, under my supervision. He has carried out the work at the Department of Chemistry, University of North Bengal.

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PREFACE

I started my journey for the research work related to my doctoral degree thesis entitled **“Design, Structural Characterization and Bio-inspired Catalysis of some Coordination Compounds Containing Polydentate Chelators”** in the year 2017 under the supervision of Dr. Bhaskar Biswas of the department of Chemistry at Surendranath College, Calcutta University, West Bengal, India. Later, I shifted to the University of North Bengal as a CSIR fellow as Dr. Biswas joined to the Department of Chemistry, University of North Bengal. My Ph.D. registration from University of North Bengal, India is on 28.05.2019 vide letter no. Ph. D /Chem. (1318) / 168/ R-2020 dated 22.01.2020.

Schiff base-metal complexes have wide applications for their versatile physico-chemical properties in various research field starting from smart electronics to efficient catalysts to metallo-therapeutics.

The present investigation deals with a series of synthetic polydentate ligands and their metal complexes highlighting their structural, photo-physical, spectroscopic and bio-functional characteristics. The physico-chemical characterizations of the compounds have been performed with a suite of spectroscopic and analytical methods and single crystal X-ray diffraction studies. The structural features and bio-oxidative coupling reactions have been further correlated with details theoretical calculations employing the Density Functional Theory (DFT). Finally, the future scope of the present investigation has been delineated with scientific and industrial significance.

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