

**STRUCTURE AND THERMAL DECOMPOSITION OF SOME TRANSITION
METAL COMPLEXES OF ALKANOLAMINES AND SCHIFF BASES DERIVED
FROM ALKANOLAMINES**

By

SUBHASH C. RUSTAGI

**Thesis Submitted to the Indian Institute of Technology, Delhi
for the Award of the Degree of DOCTOR OF PHILOSOPHY**

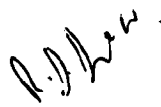
**Department of Chemistry
Indian Institute of Technology, Delhi
September, 1974.**

TO MY BELOVED PARENTS

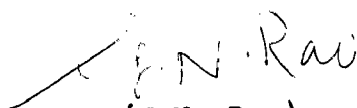
CERTIFICATE

This is to certify that the thesis entitled "Structure and Thermal Decomposition of Some Transition Metal Complexes of Alkanolamines and Schiff Bases Derived from Alkanolamines" being submitted by Mr. S.C. Rustagi to the Indian Institute of Technology, Delhi for the award of Degree of Doctor of Philosophy in Chemistry, is a record of bonafide research work carried out by him. Mr. S.C. Rustagi has worked under my guidance and supervision and has fulfilled the requirements for the submission of this thesis, which to my knowledge, has reached the requisite standard.

The results contained in this thesis have not been submitted, in part or in full, to any other University or Institute for the award of any degree or diploma.



(R.D. Dua)
Prof. & Head of the
Chemistry Department,
Indian Institute of Technology,
Hauz Khas, New Delhi-110029.



(G.N. Rao)
Thesis Supervisor

A C K N O W L E D G E M E N T

In my moment of exultance at the accomplishment of my long-cherished goal, I shall like to register my deep sense of gratitude to Dr. G.N. Rao, but for whose imponderable guidance, painstaking help and incessant encouragement, my endeavour to complete this work might have proved abortive. I am most grateful for the animated discussions on the subject with him which invariably had an ameliorative effect on the course of my work.

I am also thankful to Prof. R.D. Dua, Head of Chemistry Department, for providing me all the possible facilities and an environment which was highly conducive to research work.

I find it most opportune to acknowledge the amicable demeanour and ever helpful attitude of my colleagues, with special mention of Mr. A. Saxena who proof-read the manuscript and at times, made me audacious enough to overcome my moments of magement and despondency and provide me with the fortitude to go ahead with my work placidly.

That my cousin, Mr. Ravinder Mittal and my friends Mr. Anand and Mr. Anil K. Agarwal, came forth to help me when I needed them most, entails thanks from the core of my heart.

Members of the supporting staff, especially Mr. Bala Dutt who helped me record the spectra of my compounds, deserve kudos for being ever-ready to extend their helping hand in my hour of need.

Miss Versha's excellent typing of this thesis is highly acknowledged.

And last, but not the least, I shall not fail in expressing my feelings of gratitude to the Indian Institute of Technology, Delhi and Council of Scientific and Industrial Research for providing me financial help in the form of Research-Fellowship, the former extending this help for the first year and the latter for rest of the period.

Subhash Chand Rustagi
(SUBHASH CHAND RUSTAGI)

C O N T E N T S

| | | |
|-------------|--|--------|
| CHAPTER-I | <u>INTRODUCTION</u> | 1-52 |
| | Alkanolamine Complexes in Solid State. | 1 |
| | Alkanolamine Complexes in Solution State. | 20 |
| | Scope of the Present Work. | 39 |
| | References. | 43 |
| CHAPTER-II | <u>EXPERIMENTAL METHODS</u> | 53-69 |
| | Preparative Methods. | 53 |
| | Instrumental Techniques. | 59 |
| | Tables. | 66 |
| | References. | 68 |
| CHAPTER-III | <u>STUDIES ON METAL COMPLEXES OF ALKANOLAMINES</u> | 70-181 |
| | Isopropanolamine. | 70 |
| | Diisopropanolamine. | 91 |
| | Triisopropanolamine. | 97 |
| | N-butyldiethanolamine. | 105 |
| | Monoethanolamine. | 111 |
| | Triethanolamine. | 117 |
| | N-hydroxyethylethylenediamine | 126 |
| | Tables. | 131 |
| | Figures. | 156 |
| | References. | 179 |

| | | |
|------------|---|---------|
| CHAPTER-IV | <u>STUDIES ON METAL COMPLEXES OF SCHIFF BASES DERIVED FROM ALKANOLAMINES.</u> | 182-222 |
| | Isopropanolamine and 2-methyl 2-amino propanol. | 182 |
| | Tris-(hydroxymethyl)-amino methane and 2-methyl 2-amino 1,3 propane diol. | 196 |
| | Tables. | 203 |
| | Figures. | 213 |
| | References. | 221 |
| CHAPTER-V | <u>STUDIES ON MIXED COMPLEXES & POLAROGRAPHIC STUDIES IN CADMIUM-ALKANOLAMINE SYSTEMS</u> | 223-244 |
| | Studies on Mixed Complexes. | 223 |
| | Polarographic Studies in Cadmium-Alkanolamine Systems. | 232 |
| | Tables. | 240 |
| | Figure. | 243 |
| | References. | 244 |
| | SUMMARY. | 245-249 |
| | LIST OF PUBLICATIONS. | |