ACKNOWLEDGEMENTS

The author would like to express his deep sense of gratitude to Dr. R. V. Karanth for his guidance and constant encouragement. Without his kind help and supervision, it would not have possible for the author to complete this work.

He is highly grateful to Dr. T. K. Gundu Rao (Senior Scientist), RSIC, IIT, Powai, Mumbai for providing laboratory facilities at RSIC during the entire duration of this research work.

He is highly thankful to Prof. M. P. Patel, Head of the Geology Department for providing departmental facility and enthusiastic support.

The author is also highly grateful to Prof. S. S. Merh for his constant encouragement and suggestions.

The author his highly indebted to BRNS - DAE (35/4/94, R & D II) and CSIR - New Delhi for financial support during various phases of this study. He is highly grateful to Dr. S. M. Rao (Head), Shri. A. B. Majali, R. S. Deshpande, Shri Ashok Karlurkar, Mr. Abdul Khadir and Mr. R. S. S. Sarma, Isotope Division, BARC, Mumbai, for their help in irradiation of samples. The continuous help provided by BARC library staff is also gratefully acknowledged.

The author express his deep sense of respect and gratitude to Prof. M. S. Joshi (Professor Emeritus, Vallabh Vidyanagar) for introducing to the subject on surface topography studies on minerals and for his kind help.

The author is highly indebted to Dr. Mohan Bhadbade, Ms. Beena Narayanan and Mr. Suresh, CSMCRI, Bhavnagar, for their help in carrying out single crystal XRD studies. He is also grateful to Dr. Amitav Das (Phtotochemistry division) for helping in OAS studies.

The author is extremely grateful to Prof. A. S. Janardhan, Prof. S. Satyanarayna and Dr. B. Bassavalingu for providing EPMA analysis of samples.

He is highly thankful to Prof. Ajay Gupta (Centre Director), IUC - DAEF, Indore and to Dr. Prasanna Shah for their kind help in carrying our Mössbauer spectroscopic studies. The help provided by Dr. N. P. Lalle for powder XRD analysis, is also gratefully acknowledged. The author is extremely grateful to Prof. D. R. S. Somayajulu (Head, Physics Department, M. S. University of Baroda) and to Mr. Naresh Patel for helping in spectral fitting.

The author is indebted to Prof. N. S. S. Murthy, Metallurgy Department, M. S. University of Baroda for helping in TGA and DTA analysis.

The various spectroscopic studies would not have been possible without the help provided by Mr. Bharat and Bhavin Bhai, Khambat, in cutting and polishing of samples.

The author is highly thankful to Mr. Pankaj and Dheeraj Lunawat, Jaipur for providing samples for the study.

The author would always remember the immense help provided by Dr. V. Sridhar and Mr. Parag Sohoni in the preparation of thesis.

He is thankful to Shri Aniruddha Khadkikar and Manish Mamtani for valuable suggestions and discussions during the study. The author would always remember the help provided by his friends and colleagues Dr. Javed Malik, Jignesh Patel and Sanjay Shah.

The author express thanks to the all round help provided in various way by all the staff members of the Geology Department

Lastly the author would be failing in his duty if he does not express his most affectionate appreciation to the emotional support provided by his parents, bother and sister in law.

GEORGE MATHEW