ACKNOWLEDGEMENTS

At the outset I would like to record the fact that it would have not been possible for me to complete this thesis, if I would have not received helps, supports and encouragements from my teachers, colleagues, friends, family members and many others.

First and foremost, it is my proudest privilege to extend my heartfelt gratitude to my teacher and supervisor, Dr. Rakesh Chandra Agrawal for his mature and able guidance. He has always been an inspiring force to me not only to initiate and persue scientific carrier but to help in building my own personality. I consider it one of the greatest opportunity of my life to have come in contact with Dr. R.C. Agrawal and his wife Mrs. Madhu Agrawal. Their affection, encouragement and support enabled me to work hard to achieve this long cherished goal. I find myself short of words to express my gratitude, regards and respect to them.

With greatest respect, I express my heartfelt gratitude to Prof. Suresh Chandra, Physics Dept., B.H.U., Varanasi, who is not only the pioneeer in the field of Solid State Ionics in India but also a scientiest of highest international repute and more so my grand teacher whom I always found showering affection and communicating high level of knowledge to every one around him. I am also thankful to his wife Mrs. Usha Chandra, his daughter Dr. Amita Chandra and his son Mr. Amreesh Chandra, who have always been kind and affectionate to me.

I am grateful to all my teachers, especially, Prof. R.K. Thakur (Ex-Head, School of Studies in Physics, Ex-Vice Chancellor, Pt. Ravishakar Shukla University, Raipur), Dr. S. Bhushau (Head, School of Studies in Physics), Prof H.V. Tiwari (Head, School of Studies in Electronics), Dr. A.K. Sapre, Dr. D.K. Chakraborty, Prof. S.K. Pandey (Head, School of Physical Sciences, S.R.T.M. Univ., Nanded), Prof. R.K. Mishra (Head, School of Studies in Chemistry) for the help, support and encouragement received during the tenure of my Ph.D. work.
I wish to extend a sense of gratitude to Senior Scientists Dr. S.S. Sekhon (Amritsar), Dr. M. Salam (Nagpur), Dr. R.K. Pandey (Bhopal), Dr. S.A. Hashmi (Itanagar), Dr. H.M. Upadhyaya (Itanagar), Dr. Ajay Kumar (Ferozepore), and Senior colleagues of Solid State Ionics Group, B.H.U., Varanasi viz. Dr. K.K. Maurya, Dr. U.P. Singh, Dr. D.K. Rai, Dr. N. Srivastava, Dr. K. Pandey, Mr. B. Bhattacharya, Mr. K.M. Shaini, Mr. A.K. Singh and Dr. K.N. Mishra (Raipur), who have helped and encouraged me directly and indirectly in many ways.

I am thankful to all the staff members of School of Studies in Physics & Chemistry, U.S.I.C., especially Mr. A. Salam, Mr. P.R. Pachori, Mr. A. A. Haidary, Mr. N.R. Dani, Mr. B.K. Jethwa, Mr. K.P. Rathore, Mr. B.R. Ansar, Mr. M.L. Teckariha, Mr. B.B. Kashyap, Mr. N.K. Yadu, Mr. Soni, Mr. S.K. Yadav, Mr. P.C. Vadyalkar, Mr. V.K. Pandey, A. Sharma and others for their cooperation.

I gratefully acknowledge the immense affection, encouragement and help extended to me by number of friends and their parents. This helped to make the working atmosphere cheerful and enjoyable. Friends who deserve special mention are Ranveer Kumar, Padmakar Singh Parihar, Devendra Kumar Sahni, Neeruika Thakur, Mayank Karnahe, Rajeev Shukla, Vijay Sinha, Prashant Tiwari, Manoj Sharma, Rajeev Sahni, Sanjay Singh, Sanjay Tiwari, Chhail Bihari Singh Thakur, Ravindra Chafekar, Mohan Lal Verma, Parijat Thakur and Research Scholars of School of Studies in Chemistry.

I would also like to express my heartfelt gratitude and regards to my parents: Shri Jagannath Prasad Gupta & Late Smt. Soni Bai Gupta, to my brothers: Dr. M.P. Gupta (Reader, Geography Dept.), Shri Arun Kumar, Shri Kishore Kumar & Prashant Gupta, the only sister Re. Namrata and bhabhi Mrs. Seeta Gupta, who, despite all the odds, encouraged and inspired me to pursue the work to the best of my ability. I would always be indebted, hence, I dedicated the thesis to them.

The help received from Mr. Sanjay Agrawal in the final processing of this Thesis is thankfully acknowledged.

The mathematical assistance in the form of fellowship received from U.G.C. New Delhi, through a major research project [No. F-10.4/90(SR-I) dt. 11.07.91], is gratefully acknowledged.

Finally, I thank the almighty GOD! who has given me enough strength to complete this task.