ACKNOWLEDGEMENTS

At the outset, I express my gratitude and indebtedness to the Almighty for his countless blessings and first of all, submit my thesis at the feet of God Lord Shiva.

This thesis is the end of my journey in obtaining my Ph.D. I have not traveled in a vacuum in this journey. A journey is easier when you travel together. This thesis has been kept on track and been seen through to completion with the blessing, support and encouragement of numerous people. At the end of my thesis, it is a pleasant task to express my gratitude to all those who contributed in many ways to the success of this study and made it an unforgettable experience for me.

At this moment of accomplishment, first of all, I express my profound gratitude towards my venerable guide Prof. Ravindra Nath Singh, without the guidance, support and encouragement of whom, this work would not have been possible. He introduces me the field of electrochemistry and whose dynamic guidance and continuous motivation inspired me to discover my own dormant potentials. Under his guidance I successfully overcome many difficulties and learned a lot. His guiding spirit and constructive criticism have not only given this work its present shape but has also helped me to become a better person in every way of life. This acknowledgement cannot be complete without mentioning Mrs. Asha Singh for her motherly affection and support.

I wish to express my heartiest thanks to Prof. T.R. Rao (Ex. Head), Prof. B. Singh (Ex. Head) and Prof. Lallan Mishra, Head, Department of Chemistry, Banaras Hindu University, Varanasi for providing me laboratory space and other essential research facilities.

I take this opportunity to sincerely acknowledge the, Council of Scientific and Industrial Research through the Project in the form of Junior Research Fellowship (JRF) and UGC, New Delhi, for providing financial support which buttressed me to perform the work completely.

I thank my RPC members, Prof. U.S. Rai, Prof. V. B. Singh and Prof. Om Prakash, for their valuable suggestions and comments during my progress report submission.

I owe my sincere thanks to the ever ready support and help provided by the instrument centre, Department of Chemical Engineering, IIT B.H.U. and C.S.M.C.R.I. Bhavnagar, for enabling me to avail the XRD, XPS and TEM facilities.
I find it difficult to pen down my deepest sense of indebtedness toward my dearest grandparents (Mr. Mangani Sharma and Mrs. Gadna Devi) and parents (Mr. Prabhu Nath Sharma and Mrs. Dharma Devi) who were the first to inspire me for this work. I will always remember the mantra of patience and perseverance that inculcated into me.

I would like to convey the deep indebtedness towards my uncles (Mr. Krishna Prasad Sharma and Mrs. Vishnu Prasad Sharma), my aunti (Mrs. Kiran Sharma) my brothers (Mr. Shyam Sundar Sharma, Mr. Vinod Kumar Singh, Jugal, Satyam, Deepak), my sister-in-law (Mrs. Reena Sharma and Mrs. Neelam Singh) my sisters (Mrs. Pratima, Little, Kiran, Chandu, Abha, Shalu), my brother-in-law (Mr. Vikash Sharma, Vinay) my friends (Ashu, Abhishek, Chhotu, Dilip, Dharmendra, Asheesh, Manjeet, Vinod, Manoj, Ravishankar, Anjey, Kapil, Deepshikha, S, Shweta, Richa), my cousins (Arya and Peehu) and who soulfully provided me their constant support and the right impetus to undertake the challenge of this proportion like all other spheres of life, for what I cannot measure but treasure. They believed in me before I believed in myself.

A positive energy and humorous environment is all we need to accomplish such an arduous task. A special word of thanks to Dr. Divya, Dr. Anindita, Dr. Madhu, Dr. Rahul Awasthi, Dr. Vijay, Neeraj, for their unwavering support & encouragement always whenever, I was needed. I wish to express deep sense of gratefulness from my soul to Dr. Rahul Awasthi who always motivated me up to this title. I hereby, acknowledge the stimulating companionship and full co-operation of my colleagues Nirmala, Ajay and V.K.V.P. Srirupu. I wish to thank them for their valuable suggestions and giving the present shape to this thesis.

Needless to mention, this thesis could not have been possibly brought to a successful culmination without the blessings of Lord Vishwanath and Pt. Madan Mohan Malviya. I bow to him with limitless gratitude and humility.

Lastly, it is imperative to point out that though all may not be mentioned none are forgotten.

August 2014                                   Chandra Shekhar Sharma