## ACKNOWLEDGMENTS

With great pleasure, I would like to convey my sincere gratitude to my supervisor Dr. K. K. Singh, Associate professor, Metallurgical Engg. Dept., IIT(BHU), for being my parent during research work and providing me invaluable guidance, scientific supervision, feedback, motivation and countless constructive discussions for improving the quality of my work. I have not only earned many professional skills, but I also earned numerous moral and ethical values from him. I pray to god to enable me to carry all those values throughout my life.

I am truly indebted to Prof T. R. Mankhand, Metallurgical Engg. Dept., IIT(BHU); my of-document co-supervisor who always boosted my potential by his continuous supervision, suggestion and motivation. He is the 1<sup>st</sup> person who shown his belief in my potential of doing quality research and guided me during M.Tech. dissertation. I couldn't forget the endless support of Dr. B.D. Pandey (Ex-Chief Scientist, CSIR- National Metallurgical Laboratory, Jamshedpur) during my whole research career. Although, he guided me as a Co-supervisor during my M.Tech. dissertation, but in reality, he taught me the numerous aspects of the research work and shown me the deep insight of the R&D field.

I am highly thankful to RPEC members *viz.*, Dr I. Sinha (Applied Chemistry Dept., IIT(BHU)) and Dr. O. P. Sinha (Metallurgical Engg. Dept., IIT(BHU)) for their timely guidance, appraisal and extended support during the whole research work.

My deepest respect goes to the Head of Department for providing me regular infrastructure and financial support without which it would have never been possible to perform these extensive studies.

I am in life-long debt to Prof. S. Mohan, Prof. N. K. Mukhopadhyay, Prof. I. Chakrabarty, Dr. C. K. Behra, Dr. J. K. Singh, Dr. B. Mukharjee and all other faculty members who always helped me out at different stage during my research work.

Support provided by Prof. R. K. Singh (Physics Dept., Institute of Science BHU), Prof M. S. Singh (Chemistry Dept., Institute of Science, BHU), Prof S. K. Singh (Pharmaceutics Dept., IIT(BHU)), Prof D. Kumar (Ceramic Engg. Dept. IIT(BHU)) for availing FT-IR, NMR, TGA-DTG facilities is highly valuable.

The support provided by Mr. Naval, Mr. A. K. Vishwakarma, Mr. Setu, Mr. Lalit, Mr. J. P. Patel, Mr. V. N. Pandey and other technical/office staffs are the booster of my research work.

I am heartily thankful to Mr. Amit Singh, Mr. Angad Kumar, Kunal Kashyap, Sudhakar, Neera Singh, Girish Sahu, Nirmal Mallick, for their continuous help in availing the various analytical facilities of BHU and IIT(BHU).

The unforgettable moments, idea sharing, 24×7 support, appraisal, inspiration given by all my friends and colleague (especially Dr. Pratima, Dr. A. K. Mandal, Dr. Jitendra, Dr. Manish, Raj Bahadur, Vikas, Vivek, Vaibav, Vishwas, Manish, Arun, Rajkumar, Shavi, Sankata, Aman, Ashutosh, Govind, Aditya, Baljeet, Keerti, Divika) has always supported me to overcome ups and downs throughout in all my endeavours.

I wish to devote my hearty thanks to my research group (Arunabh, M. Basha, Dhanu, Pritesh, Soumya, Piyush, Manish, Srikant, Yamini, Neha, Rachita) for providing me a family in my laboratory itself and their extended help throughout.

I will not miss this opportunity to name few important persons- Dr. Suchita, Mrs. Rinki, Mrs. Malti, Mrs. Kajal, Ms. Swati who always stood beside me in good or bad and reinforced my will-power to groom my career.

I am unable to acknowledge my parents, family members, aunt and grandmother (both passed away) in words because their appraisals, motivations, blessings and love have always pushed me through each step of success and failure in my life. Their deep faith in me has been the only reason and strength to accomplish every deed. I just devote my true vote of thanks to the almighty for raising me with such family members. I will always be in debt to them and wish to have their blessings life-long.

Apart from these, there are many persons have not been inscribed on these pages. I devote my deep respect and sincere thanks to them for extending their direct and indirect cooperation at every milestone during my research work. Special thanks to 'Buonoz.in' for providing consistent services during all associated events.

## Himanshu Ranjan Verma