Acknowledgments

Pursuing Doctoral degree was the most esteemed goal for me right from early graduation days. It bought to me an opportunity to open my mind to the R&D world, which was my mind frame since childhood. In ups and down of my life I was very lucky to have strength and courage from many directly or indirectly helping hands who motivated me and helped me all along to fulfill my dreams and achieve the startup for early settled goal. Today I got the opportunity to pay heartily gratitude to all of them.

First, I would like to thank almighty god for giving me strength and guidance through all the way in my life. Strength, which I got, was very helpful in facing the real facts of life and moving forward in life with all the extremes.

I am grateful to Prof. Souvik Bhattacharyya (Vice-Chancellor), Prof. A K Sarkar (Director, BITS Pilani, Pilani Campus), for allowing me to pursue my research work successfully. I am immensely thankful to the Deans of the institute for providing me necessary facilities and financial support.

An experienced and supportive teacher always shapes the mind of children as well as its future. They are always a role model for the student. Sense of gratitude towards my thesis supervisors **Prof. S. C. Sivasubramanian** and **Prof. Anshuman Dalvi**, for being generous. Their fatherly love, care and guidance always motivated me and showed me right path to attain my goal. They always motivated me for right research, which will help me to become an independent researcher ahead.

I express my gratitude to Prof. Srinivas Krishnaswamy, Dean, Academic-Graduate Studies & Research (AGSR) Division, BITS Pilani, Goa Campus, and Prof. Jitendra Panwar, Associate Dean, Academic-Graduate Studies & Research (AGSR) Division, BITS Pilani, Pilani Campus and office staff of AGSR, Division, whose secretarial assistance helped me in submitting the various evaluation documents in time. I thank Prof. Inamur R. Laskar, Convener, Departmental Research Committee (DRC), Department of Chemistry, BITS Pilani, Pilani Campus for his official support and encouragement and members of DRC, Department of Chemistry, BITS Pilani, Pilani Campus for their cooperation and constant guidance during each of the past few years.

My sincere thanks to Mr. Giridhar Kunkur (Librarian) BITS Pilani, and other staff of library for their support and help rendered while utilizing the library services. I sincerely thank to Prof. Hemant R. Jadhav (Earlier - Associate Dean, ARD, BITS Pilani) for his cooperation and constant guidance during each phase of the research work.

My whole-hearted gratitude to Prof. Saumi Ray, Head Department of Chemistry, BITS Pilani, Pilani Campus for her support and encouragement. I express my heartily thanks to my Doctoral Advisory Committee members, Prof. Bharti Khungar and Prof. A. K. Sah for serving as my committee members even at hardship. I also want to thank them for their brilliant comments and suggestions.

I thank respected faculty members and scholars of Department of Chemistry and Department of Physics, BITS Pilani for their generous help and fruitful discussions during the different stages of my doctoral study. Thanks, are also to all the office staff and all research scholars of the department for their help during my work.

I gratefully thank Mr. Jagannathan (CEERI Pilani) for helping me all around to prepare melt quench derived samples. Dr. Suresh Bharadwaj (UGC DAE Indore) for thermal analysis, Mr. Ashok Kumar (Chemical Engineering, BITS Pilani), Mr. Naveen (Pharmacy, BITS Pilani), Workshop staff (BITS Pilani), SAIF-IIT Bombay for Electron Paramagnetic Resonance (EPR) facility, MRC-MNIT Jaipur for FESEM Analysis.

I am gratified to my friends and lab mates Mrs. Munesh Rathore, Ms. Neelakshi Sharma, Mr, M. Dinachandra, Ms. Gurpreet, Friends; Ms. Saroj and Ms. Sunita Poonia for awarding me a memorable tenure with exciting outings, delicious cuisines, sharing, suggestions and motivation throughout the period. We all shared lovely moments in this period. I am also thankful to all the research scholars of the department.

I then pay my heartily gratitude towards my **grandparents** ($Nani\ ji$ – **Sunderi Devi**, $Nana\ ji$ – **Ram Prasad**) who are just like living god for me on earth. They taught me to face every single moment of life with honesty and goodness with their love and esteemed care. I also pay my sincere gratitude to **Mr. Bikram Singh** (Mama ji) and **Mrs. Rekha Singh** (Mami ji) for their sincere support.

I express my gratitude towards my family for their understanding and care. A special gratitude to **Sudesh Kumari** (sister-in-law) for her remarkable support, she gave her very crucial time of her life to me and my son. It was very easy to manage both a Ph. D and a notorious kid because of her. Thank you is a very small word to express my gratitude to her and her incredible contribution to this beautiful achievement. My honest gratitude to my **in-laws** (**Mr. Ramsingh and Mrs. Berji Devi**) who deeply motivated me throughout the way in achieving this goal.

I express my sincere and heartily thanks to **Dr. Sukhveer Singh** to be always with me throughout the way to achieve this milestone with his appreciable dedication, commitment, love and care. I have no words to express my gratitude to him. I would just like to say that he was always a doctor to my wounds, friend to my sorrows, mentor to my dilemmas, teacher to my action, companion to my joys and the best partner in every crime.

Last but not the least, I pay my little gratitude to my little and precious bundle of joy (Mannan Kaswan), for being there in our life. His presence bought loads of love, elegance, and delight in life. Thanks to his tinny steps that many a times accompanied me to the lab with an undefined pleasure. He is such a small package of happiness in life that many a times unknowingly shook off the entire goings in life. This is the most incredible and sweet part of my doctoral degree which is really a golden memory. Love you very much Manu Betu.

At the end, I would like to acknowledge each, and every soul directly or indirectly involved in this journey – "Sometimes in the middle of my little mess, I forget how big I am blessed."

Rajinder Kaswan (Nee Rajinder Shivran)