ACKNOWLEDGMENTS

The work presented in this thesis would not have been possible without my close association with many peoples who were always there when I needed them the most. I take this opportunity to acknowledge them and extend my sincere gratitude for helping me make this thesis a possibility. At this moment of accomplishment, first of all I would like to pay the homage to the founder of Banaras Hindu University, Pandit Madan Mohan Malvia ji, who made this glorious temple to realize spiritual, technical and scientific knowledge about this vast existing universe.

I embrace the opportunity to express my deep sense of gratitude to my supervisor Dr. Akhilesh Kumar Singh, Associate Professor & Coordinator, School of Materials Science & Technology, IIT(B.H.U.), Varanasi for his constant guidance, valuable suggestions and kind encouragement during my association with his research group. His encouragement, constant support, intellectual stimulation, perceptive guidance, immensely valuable ideas, and suggestions from the initial to the final level enabled me to develop an understanding of the subject. His scholarly suggestions, prudent admonitions, immense interest, constant help and affectionate behavior have been a source of inspiration for me. His suggestions will remain with me as an inexhaustible source of scientific learning throughout my life.

I would like to thank Prof. Dhananjai Pandey and Dr. Chandan Upadhyay, School of Materials Science & Technology, IIT(B.H.U.), for supports through providing lab facilities. I gratefully acknowledge CIF, IIT(BHU), Varanasi for providing various instrumental facilities. I would also like to thank the faculty members of the School, Prof. Rajiv Prakash, Prof. Pralay Maiti, Prof. Jitendra Kumar, Dr. S. R. Singh, Dr. Chandana Rath, Dr. Bhola Nath Pal, Dr. Ashish Kumar Mishra, Dr. Shrawan Kumar Mishra and Dr. Sanjay Singh (School of Materials Science and Technology, IIT(BHU), Varanasi) for discussion during seminars and valuable suggestions given by them. I am indeed obliged and sincerely thankful to my RPEC member Dr. Akansha Dwivedi, Department of Ceramic Engineering, IIT(BHU), Varanasi for his guidance and untiring attention right from the inception to the successful completion of assigned research work. I am grateful to Dr. Ashish Kumar Singh (DST-INSPIR Faculty), and Dr. Parmanand Jena (Institute-PDF) for truthful discussions.

I would also like to acknowledge my seniors Dr. Shruvrajyoty Bhattacharjee, Dr. Anar Singh, Dr. Jay Prakash Patel, Late Dr. Ravindra Singh Solanki, and Dr. Pappu Kumar Harijan for their valuable support.

I am also thankful to my friends and colleagues Mr. Narendra Kumar Verma, Mr. Pramod Yadav, Mr. Durgesh Kumar Yadav, Mr. Chandra Bhal Singh, Mr. Keshav Kumar and Mr. Dinesh Kumar for always being there and bearing with me the good and bad times during my wonderful days of Ph.D. Also I am thankful to my juniors of lab specially Ms. Monika Singh, Mr. Pragyanand Prajapati, Ms. Krishna Prajapati and Ms. Pooja Sonkar for providing pleasant, encouraging and friendly environment.

I am also thankful to all, to whom I could not mention here who helped me directly or indirectly throughout the work. I am thankful to all non-teaching staff of the School for their cooperation at all levels.

I express my indebtedness to my parents Smt. Gulaychi Devi and Sri Lalta Prasad and my all sisters for their love, affection and support during every moment in my life. I would like to express my heartfelt appreciation to Ms. Manjita Maurya for her keen patience and wonderful support. I gratefully acknowledge the Indian Institute of Technology (Banaras Hindu University), Varanasi for providing me the necessary funding and fellowship to pursue research work.

Finally, I am grateful The Almighty God for giving me strength to face all the challenges of life.

(Sushil Kumar)