<u>Acknowledgements</u>

First of all, I would like to express my profound gratitude towards erudite scholar and my supervisor **Dr. Akhilesh Kumar Singh**, for his guidance, suggestions, motivations and kind support with keen personal interest throughout the progress of my Ph.D. work. The Ph.D. works have been a learning and growing experiences which laid a progressive path towards my career goal. I could not have imagined having a better advisor as my guide. It is a matter of pride to have been associated with him and I will always remain thankful for his caring nature.

I would like express my gratitude to the faculty members of the school, Prof. Dhananjai Pandey, Prof. Rajiv Prakash (Coordinator, School of Materials Science and Technolgy, IIT (BHU)), Prof. Pralay Maiti, Dr. (Mrs.) Chandana Rath, Dr. Chandan Upadhyay and Dr. Bhola Nath Pal for their encouragement, suggestions and support during my Ph.D. work.

I heartily acknowledge Dr. S. K. Mishra (BARC), for their unconditional help and valuable experimental facility extended during my research work.

I would also like to acknowledge my seniors, Dr. S. Tripathi, Dr. A. Singh, Dr. V. K. Tiwari, Dr. N. Singh, Dr. A. Mishra, Dr. S. Bhattacharjee, Dr. R. S. Solanki, Dr. J. P. Patel, Dr. K. Jana, Dr. P. Mohanty, Dr. V. P. Singh, Dr. R. Pandey, Dr. R. Pandey, and Mr. Pappu Kumar for their decent support and suggestions.

I am also thankful to my friends and colleagues Mr. Dinesh Patel, Dr. Gopal Ji, Mr. Sandeep Gupta, Mr. Uma Shankar, and Mr. Arun Mahanta. I would like to thank my juniors Mr. Sushil Kumar, Mr. Narendra K. Verma, Mr. C. B. Singh, Mr. Dinesh Kumar, Mr. Arun Kumar, Ms. Madhu Tiwari, Ms. Priti Tiwari, Mr. Pramod Yadav, Mr. Arpan Bishwas, Ms. B. Bharati, Ms. Priyanka, Mr. Jagdish, Mr. Manish Singh, Mr. S. Senapati, Mr. Sandip Kumar, Mr. Anand Sharma, Mr. Satyveer Singh, Mr. Keshav Kumar, and Ms. Monika Singh for providing pleasant, encouraging and friendly environment.

The cooperation, moral support and constant encouragements, I have always received from my all-time friends, cannot be expressed in words and I feel lucky to be blessed with such wonderful friends. Some of them who deserve special thanks are: Mr. Akhilesh Kumar Chaudhari, Dr. Prashant Shahi, Dr. C. P. Dubey, Mr. Awanish Tripathi, Mr. Himanshu Pandey, Mr. Anand Mishra, and Mr. Shiv Kumar.

I am greatly thankful to my uncles and aunts Sri Shashidhar Upadhyay, Smt. Indu Upadhyay, and Sri Chandra Prakash Upadhyay, Smt. Anita Upadhyay and my beloved sisters Smt. Ragini Pandey, Smt. Shalinee Pandey and Miss Nandini for their unconditional support and love throughout my life. My specially thank to my cousins Mr. Abhishek, Miss Jyoti, Miss Shikha, Miss Shakshi, Mr. Shubham and Mr. Shivansh and my nephew and niece Shashwat and Swarnika Pandey for their love and affection. My love and well wishes are always with them.

I will be always grateful to Mahamana Pt. Madan Mohan Malviya Ji for establishing this capital of knowledge (BHU). I would like to express my heartfelt gratitude to all the technical and non-technical staff of the school for their support and help in experimental and official works.

Finally, I am grateful to lord Shiva, Maa Annapurna and Maa Vindhyavasini for providing me potential to face all the challenges in life.

(Ashutosh Upadhyay)