

---

---

## Acknowledgements

---

---

I am using this opportunity to express my sincere thanks and gratitude beyond words to my supervisors, Dr. Girija Shankar Mahobia and Dr. Om Prakash Sinha for their consistent help, encouragement and valuable discussions during the entire period of my research work. I would not have been able to complete the thesis without their utmost involvement and invaluable efforts. They motivated me to pursue research problem and the need for persistent effort to accomplish the goal. I am truly indebted to them. They are the real definition of a best teacher being friendly and behind for all problems of not only mine but all the students.

Besides my Supervisors, I would like to thank Prof. Vakil Singh (Emeritus Professor, Department Metallurgical Engineering) and my RPEC members Dr. Kausik Chattopadhyay (Associate Professor, Department Metallurgical Engineering) and Dr. Bhawana Verma (Associate Professor, Department Chemical Engineering) for their insightful comments and encouragement.

I sincerely thank Prof. N. K. Mukhopadhyay, Head of the Department of Metallurgical Engineering and the former Heads Prof. R. K. Mandal and Prof. G. V. S. Sastry for providing all the research facilities to successfully accomplish my research in the Department.

I have deep sense of gratitude to Prof. Sunil Mohan, Prof. N. C. Santhi Srinivas and all other faculty members of the Department of Metallurgical Engineering, IIT (BHU), for their cooperation and inspiration.

I am thankful to my all friends Dhananjay, Shubash, Vaibhav, Mukesh, Vikas, Vivek, Harikishore, Ravindra, Deepak, Ashish and my juniors Ankitendran, Rajkumar and Sharvan especially for their constant encouragement, making joyful and memorable life being with my moments of happiness and troubles at IIT (BHU).

I am also thankful to all the Lab and workshop staff specially Shri Sushil Ji, Shashi Ji, Bal Govind Ji and all the office staff.

Last, but not the least, I would like to express my deepest gratitude to my parents Smt. Madhu singh and Shi Kishore Singh, for giving my life in the first place, for educating me, for their unconditional support and encouragement to pursue my interest. I must express my sincere thanks to my sister Renu Singh for her support and encouragement. A special word of thanks to my wife Smt. Shalini Chauhan for putting up with my irregular work schedules with commendable understanding, for her constant encouragement and support.

I also wish to thank all my friends and the persons whose names have not been mentioned on this piece of paper for extending their cooperation directly or indirectly.

**(Manishkumar K. Singh)**