

## **Acknowledgement**

*To my life-coach, God: because he always enlightens the path whenever I unable to resolve the issue in my research, I owe it all to you. Many Thanks!*

*Initially, I would like to express my deep sense of gratitude to my supervisor Prof. Yogesh Chandra Sharma, Department of Chemistry, Indian Institute of Technology (Banaras Hindu University), Varanasi, for his valuable guidance, constant support, critical and motivating comments throughout the completion of this research work. It is my pleasure to express my deepest admiration and heartiest thanks to him for helping me to learn the subject and to develop an interest for further research in this area. Special thanks to my co-supervisor Prof. Ram Prasad, Department of Chemical Engineering and Technology, Indian Institute of Technology (Banaras Hindu University), Varanasi, who continuously advised, support and inspired me throughout the research.*

*A very special gratitude goes out to the Department of Chemistry and MHRD for helping and providing the funding for the research work. I am also thankful to my RPEC members Professor P. K. Mishra as an external expert from Department of Chemical engineering and Technology and internal subject expert Dr. M. Malviya for their valuable suggestion.*

*With a special thanks to my seniors Dr. Uma, Dr. Bhaskar Singh, Dr. Varsha Srivastava, Ms. Shweta Agrawal, Dr. Arun Srivastava, Dr. Deepak Gusain and Dr. Sushmita Banerjee for their suggestion and healthy discussion of my research issues. I am also thankful to my colleagues and juniors Dr. Shikha*

*Dubey, Dr. Devarapaga Madhu, Ms. Veena singh, Ms. Reena Singh, Ms. Meena Yadav, Ms. Shalini Sahani and Ms. Taniya Roy for their support and assistance during my research work. I am also thankful to other lab members in different department Pratichi singh, Suverna, Diva Bhatt, Shikha Sharma, Deepak yadav and Subhashis for their appreciated support during my research work.*

*My forever interested, encouraging and always enthusiastic my father Parmanand Mishra and my mother Gambhira mishra : they were always keen to know what I was doing and how I was proceeding, although it is likely that they have never grasped what it was all about! I love your screams of joy whenever a significant momentous was reached and also just your general impudence. I am grateful to my sibling elder brother Ajay Kumar and younger sister Rajani jha, who have provided me through moral and emotional support in my life. I am also grateful to my other family members Deepak jha, Aaradhya and who have supported me along the way.*

*I am also thankful to CIFC and their staff members, teaching and non-teaching staff of Department of Chemistry for their support during research work. Finally, last but by no means least, also to everyone in the impact hub, it was great sharing laboratory with all of you during last five years. Thanks for all your encouragement!*

**Date**

**Ashutosh kumar**

Research Scholar  
Department of Chemistry  
Indian Institute of Technology (BHU)  
Varanasi 221005, India