Acknowledgements

It is a matter of great pleasure and privilege for me to express my deepest sense of gratitude and indebtedness to my PhD supervisor Dr. Robin Kumar Dutta, professor of Department of Chemical Sciences, Tezpur University, for his constant support, supervision and valuable suggestions to undertake the present research work. I am happy and very lucky to say that he provided not only guidance of my research work but also stands behind me whatever I needed in my distress. I am always thankful to him for introducing and capturing me to this exciting and interesting field of practically useful research. His tireless passion, valuable suggestions, constructive censures were always a source of inspiration for me to complete my PhD work with ease and confidence. I am very much thankful to his life partner, Dr. Mira Dutta Madam and their two daughters Narzee and Tara for their love and support.

I take this opportunity to express my sincere thanks to the Head, Department of Chemical Sciences, Tezpur University, for giving me the approval to work in this department. With the deep sense of gratitude, I would like to thank my doctoral committee members, Professor Swapan Kumar Dolui and Dr.Panchanan Puzari for their constant inspiration and valuable suggestions during my research work.

I am grateful to the administrative and technical staff of the Department of Chemical Sciences, Dr. Biren Gohain, Manuranjan Sarma, and Sankur Phukon for their help and technical support. It is pleasure for me to mention the name of Manuranjan Sarma again because he took many hectic situations during the analysis of large number of samples of my research work.

I would like to thank one of my best friends Jugal Bori, Technical Assistant NEIST, Jorhat for his help in heavy metal analysis. My sincere thank goes to technical staff of the Department of Physics, Tezpur University for XRD, SEM-EDX analyses.

I am very much thankful to Tezpur University for giving me the financial support in the form of institutional fellowship to carry out the research work conveniently.

I cannot express enough my gratitude to my labmates, Shreemoyee Ba, Anisha Ba, Sweety Ba, Borosha, Gautam, Rajkaml, Asadulla, and Abhijit for being always available when I needed their help, their inspiring suggestions and encouragement in the time of research and completion of this thesis.

I am very much thankful to my friend cum advisor Basanta Saikia who maintains our friendship always stronger and helps unconditionally at any moment during my educational carrier. It is also great pleasure for me to get Kiranjyoti Mohan as my friend who always supported and gave suggestions to me during my research work.

Senior research scholars of Tezpur University, specially Dhaneswar Da, Bhaskar Da, Probnob Da, Satyabrot Da, Pranjol Da and many more for their help and encouragement. I am also thankful to my brother cum teacher Sanjeeb Mahanta for his inspiration and suggestion at every moment during the PhD time.

Friends and brothers like Asish, Bikash, Kumar, Iftak, Simanta, Rituraj, Prasujyo, and many more were always amazing and helpful at any instant.

Lastly, I want to take the opportunity to express my respect and love towards my family members my mom, dad and two brothers who sacrifices many more unconditionally because of me. It is great pleasure for me to get Dr. Niranjan Bora as my brother cum best friend and I pray for god to give brother like him to everyone.

Finally, I acknowledge my indebtedness to the Almighty who made everything possible for me.

Anup Jyoti Bora