Acknowledgement

This PhD thesis is based on research conducted by me on organic photovoltaic devices. It is an outcome of a few years of fervid learning and research experience. At this stage, I would like to extend my heartfelt thanks to all those who offered help and support during the PhD period and without whom this thesis would not have been possible.

My foremost gratitude is to almighty for giving me strength and patience to complete this step.

I would like to express my deepest gratitude to my respected teacher and supervisor, Prof. S.K., Dolui for his inspiring guidance, endless patience, work of freedom and giving me the opportunity to work in his laboratory. It would have not been possible for me to complete my research work without his help, fatherly care and constant encouragement throughout this period. Words cannot express how grateful I am for all the concern.

I am grateful to Prof. A.J. Thakur and Dr. D. Mohanta Sir for their suggestions and discussions. I am grateful to all the faculty members of Department of Chemical Sciences for their help and suggestions.

My sincere thanks go to Dr. A.R. Pal and Dr. H. Bailung Sir, Institute of Advanced Study in Science and Technology (IASST), Guwahati for providing me the initial idea of the solar cell fabrication. I am thankful to Dr. A. Patra Sir and R. Bhargav, National Physical Laboratory (NPL), New Delhi for giving me the opportunity to do solar cell fabrication work in their laboratory.

I would like to acknowledge the sophisticated instrument facilities received from Department of Chemical Sciences and other Departments of Tezpur University. I would like to acknowledge North Eastern Hill University (NEHU), Shillong and North East Institute of Science and Technology (NEIST), Jorhat for providing instrument facilities.

I am particularly thankful to technical staff, Department of Chemical Sciences for arranging instrumental and laboratory facilities throughout the study. Special thanks also go to office staff, Chemical Sciences Department. They are always there for us.

I am very much grateful to the authors of books, monographs, handbooks, reports, patents, research papers, etc. which helped me in writing this thesis.

My special thanks go to my lab mates and friends Binod Da, Lakhya Da, Amar Da, Isha Da, Monalisha Ba, Momina, Dhaneswar, Bhaskar, Bikash, Kiran, Chandrama, Jonali, Jayashree, Anindita and Shimanta for their aspiring guidance, invaluably constructive criticism, and friendly advice during my work. It has been a great adventure. I will remember forever for their friendship and help.

I am also thankful to all my friends, seniors and juniors especially Iftikar, Manjit, Sikha ba, Bandita ba, Prarthana ba, Neelima ba, Ratan da, Ujjal da, Manoj da, Nazrul da, Pritom, Mili, Momi, Suparna, Pearl, Jonali, Nurjahan, Banashree, Upasana, Bandana, Sandhya, Samiran, Koushik, Kashmiri, Arunav, Rocktotpal, Mitu and Monmi for their support and help. I would also like to express my love and gratitude to Mridu, Nib, Pronob, Priyanka, Deba, Dikshita, Tutu, Seema and Monsumi. Thank you very much for being my wonderful friend.

I am grateful to Mrs. Sutapa Dolui for her motherly care, kindness, and encouragement and Swapnil for his brotherly affection and support.

I am thankful to library staff and administrative staff of TV for cooperation and Department of Electronics and Information Technology (DeitY), New Delhi for financial support.

I feel proud to have two persons in my life as my parents, deuta Mr. Manik Sharma and maa Mrs. Sabitri Devi. I would like to convey my heartfelt respect to them for their blessing, love, and affection. Your eternal love will be always in my heart and inspire me in every step of my life. I would like to express my respect and gratitude to my Baideu, Putu baideu, Nitu baideu, Miku baideu, Thunu ba, Maina, Jhumpa, Pokhi, Aarna, Messi and my brothers-in-law for their constant encouragement, inspiration, and support throughout my studies to fulfill my dream. My special thanks go to Biswajit bhindeu and Anupam bhindeu for their brotherly care, encouragement, advice and endless wishes.

Finally, I thank the authorities of Tezpur University for granting me the permission to carry out this work.

Shyamalima Sharma