Acknowledgements

It is my great pleasure to thank my Supervisor Prof. R. Thangaraj, Department of Applied Physics, Guru Nanak Dev University, Amritsar, India for his patience and guidance throughout my years as a graduate student. He gave me the opportunity and freedom to find my own research problem and encourage me to work on it under his able guidance throughout the years. I believe that his supervision has helped me to become a better researcher and prepared me for the upcoming challenges in my professional career.

It is my sincere thanks to Dr. Atul Khanna, Head of the Department for providing me the departmental facilities.

It gives me immense pleasure to thank my teachers Prof. S.S. Sekhon, Prof. M. Mian, Dr. K.J. Singh, Dr. Kamal Preet Kaur, and Dr. Manupriya, Department of Applied Physics for all of their assistance and thoughtful comments during the tenure of the work.

I also wish to thank Dr. Praveen Kumar and Dr. Boor Singh whose timely help in technical aspects during early period made me to reach at this stage.

I thank Dr. T. S. Sathiaraj, Department of Physics, University of Botswana, Botswana for his help in the X-ray, SEM, UV-visible and EDAX analysis.

It is high time to acknowledge my labmates Dr. Nikhil Suri, Dr. K. S. Bindra, Muneer Ahmad, Ravi Chander, Digvijay Singh, Sandeep Kumar, Jagbir Kaur and from the department Dr. Suyeb Ahmed Khan, Parshotam Sharma, Dushyant, Dilrajpreet Kaur, Sandeep Kaur, Dr. Jitender Paul Sharma, Dr. Narveer Singh, Rajinder S. Kaundal, Anu Bajaj and Amanpreet Kaur who stood by my side whenever and wherever the need arose during my research work. I wish to extend my thanks to Dr. Vipan Kumar, Dr. Gaurav Bhargava, Amit Anand, Pardeep Singh, Lakhwinder Singh, Ashish Kapur, Tilak Raj, Rohit Sharma, Vikrant Sharma, Dinesh Pathak and Arvind Kumar for their positive attitude and constant encouragement during the course of my research work.

I am thankful to all the non-teaching staff of the department of Applied Physics, Applied Chemistry and University Science Instrumentation Center (USIC) for their immediate response for solving the difficulties.

Finally, I extend special thanks to my dear father (Sh. Surender Sharma), mother (Smt. Pawana Sharma), Sister (Yogita), brother (Dinesh) and Wife (Tanu), who provide me the love and support during this odyssey and showing me the right path for achieving success. Without their moral support and inspiration, it would have not been
possible for me to carry out my research work successfully. Their affection has always been the great inspiration for me to be patient and to concentrate on my work during my tough periods.

    Above all I express my heartfelt gratitude to “God” who has always been the impelling force behind man’s efforts. Having unflinching faith, my sincere and earnest gratitude is extended to the almighty, which helped me in the achievement of the given task.

(Jitender Kumar)