ACKNOWLEDGEMENTS

It has been an honor and privilege to work with Prof. Shailaja Mahamuni. In addition to the wealth of suggestions, she has given me the confidence, support, and freedom that I need to grow and be successful. Her wonderful qualities and sincerity as a supervisor would be an exemplary guidance for me throughout life. I am greatly thankful to her for giving me an opening in an exciting field of nanoscience.

I am grateful to S.A.I.F. Indian Institute of Technology, Mumbai for providing me HRTEM measurements. I thank Prof. T. Sripathi and Dr. U. P. Deshpande, IUC-Indore for XPS measurements. Thanks are due to DST Nano-unit and C.N.Q.S. of Department of Physics, S. P. Pune University for TEM measurements, Optical absorption spectroscopy, Raman spectroscopy and X-ray diffraction facilities. I am grateful to Dr. Arindam Chowdhury and Mr. Amitrajit Mukharjee for allowing me to perform single particle measurements. Even though those experiments were not successful, I learned a lot from you about microscopy in general. I am thankful to Prof. D. D. Sarma, Dr. Anshu Pandey of Solid State and Structural Chemistry Unit, I. I. Sc. Bangalore for temperature dependent time resolved photoluminescence measurements and helpful discussions.

I would like to thank Head, Department of Physics, S. P. Pune University for allowing me to avail the departmental facilities. I am grateful to all non-teaching staff in the department for their constant cooperation.

My deepest thanks are to my seniors, Dr. Amit Lad, and Dr. Darshana Inamdar for their help, support, guidance and the long discussions we have had. I am thankful to my lab mates Dr. Shital Kahane, Nilesh Pote, Dr. Deepak More, Swapnil Doke, Aparna Shinde, Amruta Lohar, Priya Khatri, Mohd. Abdul Haque, Milind Shewale, Shital Malvankar for their help and support. I thank all the friends in and around Department of Physics for being there with me. Special thanks are due to Dr. Ch. Rajesh and Dr. Kiran Sonawane. Without you two my life here wouldn’t have been so joyful and soothing. Thanks for always being there in my joy and sorrow. I really learned a lot from you two.

I would like to thank my family. I know a thank you is not enough for your efforts of raising me as a son Aai. The sacrifices you made, the overtimes you did are really beyond a thank you. Baba, you were my rock. You believed in me and pushed me for this
arduous journey, but believe me, it was more fun because I knew you two would be there for me whenever I need a pat on back or a shoulder to cry. Most importantly, I thank my lovely wife Supriya, for her unconditional, persistent help and support and love. My thesis would not have been completed without her efforts. I really thank you for bearing with me, for being there with me in every aspect of the doctoral study. I am also grateful to my in-laws for their patience and cooperation throughout this entire period and for all their motivation and encouragement. Thanks to my brother-in-law for handling all the responsibilities of my wife and Kabeer. I extend my gratitude towards all my extended family members and friends for their motivation and support. It would be hard to end this without thanking my adorable son Kabeer for letting me work for long hours. 😊

I would like to thank all those people who have helped me directly or indirectly in pursuing this degree. Financial assistance from Department of Science and Technology, India and Board of Research in Nuclear Science, Department of Atomic Energy, India is gratefully acknowledged.

Finally yet importantly, I acknowledge the administrative support provided by the Ph.D. section of the University for their co-operation and assistance for all the admission and thesis submission procedures.

Chinmay Phadnis