Acknowledgement

It has been 28 years, since I joined the school first time and now, this thesis marks an end to my student life. A new era is going to start!

I find it necessary to thank all those who helped and encouraged me during these years, especially during the course of my Ph.D. work.

First and foremost, I would like to express my sincere gratitude to my guide, Prof. (Mrs.) S. K. Kulkarni for giving me the opportunity to work on many exciting projects and for her faith, guidance and support throughout the course of my Ph.D. research. Her love and enthusiasm toward scientific research has been a good example for me.

I am thankful to Dr. S. W. Gosavi for his constant help and support. I would also like to thank him for his help in XRD and XRR measurements.

I would like to thank Prof. V. B. Asgekar for his constant encouragement and useful discussions especially during my seminar presentations.

During the course of my research work, I had the privilege of working with Prof. S. B. Ogale and his colleagues at Center for Superconductivity Research (CSR), University of Maryland, College Park, USA. I benefited from his guidance in every aspect during my Ph.D. study. Dr. Ram Janay Chaudhary, Dr. Darshan C. Kundaliya and Dr. Sanjay R. Shinde have helped me all the time with necessary experiments to be carried out at CSR. I am thankful to all of them for XRD, magnetoresistance and magnetization measurements.

The gratitude also goes to Dr. S. -W. Cheong and Dr. Soonyong Park from Department of Physics, Rutgers University, New Jersey, USA for their collaboration and help in dielectric measurements.

I would like to thank Prof. J. Urban from Department of Inorganic Chemistry of Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin (Dahlem), Germany, for his breath taking HRTEM micrographs.

I am thankful to Prof. A. Gupta, center director, UGC-DAE Consortium for Scientific Research (formerly known as IUC-DAEF) for allowing me to use the facilities
at multilayer deposition laboratory. For this I have received help from late Dr. S. M. Choudhari and Mr. Satish Potdar to whom I am grateful.

I am thankful to Prof. S. K. Date, former head of Scientific Instruments Laboratory (SIL), NCL, Pune, for giving me the opportunity to use the VSM facility. I appreciate the help from Ms. Kulkarni for carrying out the measurements.

I would like to thank Dr. Phatak from C-MET, Pune, for his help in TG/DTA measurements.

I am thankful to Ms. Renu Pasricha from NCL, Pune, for her TEM micrographs.

I had an opportunity to be a part of a team of eminent scientists working at Nanospectroscopy beamline, Elettra, Trieste, Italy. It was great to work with Prof. Federico Rosei, Dr. Stefan Heun, Dr. Andrea Locatelli and Mr. Fulvio Ratto. I would like to thank them all.

I would also like to thank Prof. P. V. Panat and Prof. D. S. Joag, former and current heads of the Department of Physics of University of Pune, for allowing me to use facilities available in the department.

I show my gratitude for the friendship, love, support and helping hands from my friends in our research group, Dr. Neha Hebalkar, Dr. Rahul Purandare, Dr. Anita Ethiraj, Shriyas Ashtaputre, Aparna Deshpande, Jayashri Chimanpure, Madhavi Bangal, Moussa Ali Ahmad, Ravi Dey, Suchita Kalele, Sonali Marathe, Akanksha Singh, Majid Kazemian Abyaneh, Abullais Ahmed, Shadie Hatamie, Neha Tiwari, Shashi Singh, Prashant Lihitkar and Swati Bhalerao.

Rahul and Shriwas have kindly helped and supported me throughout my research work. I have no words to thank them.

Laxman Kankate, Pippaladkumar Pandey, Dr. Mahesh Abegaonkar and Dr. Atul Baghwat have always kindly helped me by providing me the references and useful discussions. I appreciate their help and kindness.

Good friends with helping hands at Department of Physics, let me feel at home. I am thankful to Datta Late, Mandar Sahasrabudhe, Suhas Jejurikar, Sanjay Harchirkar, Alka Deshmukh, J. V. S. HariKrishna, Ahmed Al-Tabbakh, Nandan Tandon and Dr. Sailaja Krishnamurthy.

I would like to thank all my friends who made my life in India colorful. Ali Nayeri, who introduced Pune University to me; Peyman Ahmadi, Farshid Farzad, Tayyebe Abbasi, Golbarg Heydari, Shahab Zorriasatein, Bahare Shirazi, Arman Shfieloo, Ghazal
Shafaei, Amir Hajian, Ali Dariush, Alireza Rafiee, Parisa Ahmadi and Akram Behrouz with whom I have shared all ups and downs of Pune life.

I believe that old is gold so the gratitude goes to my old friends, Dr. Ali Naji and Dr. Hoda Boroujerdi for their timeless love and support; Dr. Sima Ghassemi and Dr. Saman Moghimi for their endless love and encouragement and Bahman Roustaai for his brotherly help.

The research fellowship, by UGC, India is appreciated.

Finally, I would like to thank my parents for their love, enthusiasm and support. I wouldn’t have gone this far without their unfaltering belief and support. I am proud of them.

I would like to thank those named and unnamed once more.

Pune
May 2006

Sharmin Kharrazi