Acknowledgements

This doctoral research could not have been conducted were it not for several people who offered advice, inspiration and encouragement.

To my advisor, Dr. S. Sivaram: your clever insights and extensive knowledge of polymer chemistry coupled with your concern for people and promotion of others, has inspired me to persevere through difficult stretches of research. I am certain that the guidance and training you have provided me has laid the foundation for future success.

I would like to thank council of scientific and industrial research, New Delhi for the award of fellowship and Director, NCL for allowing me to carry out this investigation in this prestigious research laboratory.

I take this opportunity to express my deep sense of gratitude to Dr. C. Ramesh for his extreme cooperation, help and patience. His valuable suggestions went a long way in giving appropriate dimension to this work. I sincerely thank Dr. C. V. Avadhanl, who extended his help and support whenever I needed and Dr. P. P. Wadgaonkar for valuable discussions and references.

With much pleasure I thank my friends Nirmala, Ramanathan, Soumen, Shrilakshmi, Viji, Sulatha, Bindu, Uday and Sachin for their valuable and timely help.

Many thanks go to all my colleagues and scientists in polymer chemistry division for their cooperation. I thank the members of central NMR facility, elemental analysis, SIL, SMIS, glass blowing, stores, workshop and administrative group for their technical support.

I am blessed with very loving and caring parents in law and sisters in law. I am grateful to them for their sincere encouragement and love, especially to my mother in law for boosting my enthusiasm all the time. Special gratitude goes to my parents for their support and commitment to help me succeed. The highest recognition goes to my mother, whose hopeful disposition, timely encouragement and deep faith in her God has motivated me to persevere and properly prioritize my life. To my father, who instilled in me desire to learn, strong work ethic and the value of common sense. I should not fail to mention my sister Vidhya and brother Dnyaneshwar for being with me and giving moral support all the time.

And this is to my love, Shankar: your lavish support, immense love and patience beyond limits have brought this thesis to a reality. Your energy and exuberance always lifted me higher. Your smile brightens my every day.

(T. E. Sandhya)