Acknowledgements

The work presented in this thesis is the result of enormous help and support I have received from many well wishers.

First and foremost, I wish to express my sincere heartfelt gratitude to my research guide Dr B B Kale (Scientist F), for providing excellent opportunity of research under his able guidance. His tireless enthusiasm and integral view on research and thrust towards quality of work impressed me and will be the driving force in my future career.

I express my sincere gratitude to Dr. D. P. Amalnerkar (Executive Director, C-MET), Dr. U. P. Mulik (Director, C-MET, Pune) and C-MET authorities for their support and permitting me to avail lab facilities during this work. I extend my thanks to Mr. P. V. Bhoite (Admin. Off.), Mr G B Rao (Finance Off.), Mr V N Shete and all Administration, Finance, Security and Conservancy staff of C-MET labs for their help and support.

I am grateful to Dr V. H. Rane (Scientist, NCL), Dr. A. K. Nikumbh (Professor, Dept of Chemistry, Pune University), Dr P A Joy (Scientist, NCL), Dr B A Kulkarni, Dr V D Kelkar for their proactive support throughout the years. I place on record the support of many individuals from CMET, Thrissure, C-MET, Hyderabad, IIT-Mumbai, IIT-Roorki, NCL, Pune University, CSMCRI, Bhavnagar for extending research resources available with them and for scientific discussions. I am also thankful to UGC (Western Zone) and BCUD, Pune University for their permission in awarding teacher fellowship.

I express my special thanks to my research colleagues and friends Rajendra Pandurang, Sunil Kadam, Nilima Warule, Dr. Sambhaji Warule, Ashwini Bhirud, Ujawala Kawade, Sonali Mahapure, Mohini Jagtap, Vishal Kale, Sunil Garje, Mohaseen Tamburgi, Santosh Patil, Dr. Prakash Palai, Chitra Ugale, Shashikant Tekale, Payal Bhavtankan, Prof Rahul Diggikar, Dr. Mrs. J. H. Thorat, Dr. Ranjit Hawaldar, Vivek Rane, Dr. Govind Umarji, Dr. Manish Shinde, Dr. Sudhir Arbuj, Jagannath Mali, Sudhir Lone, and Prasad Chaudhari, with whom I have spent a significant portion of my time in C-MET, having several unbroken discussions and also for long, frequent and enjoyable tea breaks. All of them were there around me to support, and to motivate. I also extend my thanks to Dr. Milind Kulkarni, Dr. R S. Sonawnae, Mr. S. K. Apte, Mr. J D. Ambekar, Mrs Sonali Naik, Mr. Marimuthu and Dr Parag Adhyapak.
I am also thankful to Dr. Sunit Rane, Dr. Girish Pathak for their generous help. I would like to thanks all new comers in the laboratory. It is difficult to overstate my gratitude to Dr. D. D. Patil and Dr. K. G. Kanade for their support over the years. I must thank Mr. Ganesh Ransing, Balasaheb Jadhav, Tushar Punde, Shantanoo Kadam for their valuable assistance.

I am grateful to the President of Pune District Education Association (PDEA), Hon’ble Mr. Ajitdada Pawar (Dy. Chief Minister, Govt. of Maharashtra) and Mr. Rajendra Ghadage (Representative of PDEA president), Mr. Sandip Kadam (Hon Secretary), Mr. Mohanrao Deshmukh (Treasurer), Mr. P. E. Kulkarni (Dy. Secretary), Mr. A. N. Jadhav (Joint Secretary), PDEA office staff and all former office bearers of PDEA for their support and encouragement over the years.

My deepest sense of gratitude to Dr. Manohar Chaskar (Principal, B. G. College, Sangvi,), Prof. S D Aghav (vice principal), Prin S. N Kukle, Prin. R. M. Misal, Without their support and encouragement, this task would not have been completed. I am also thankful to Dr. S. V. Jagtap, Dr. R. A. Pawar, Prof. Mrs. Maneesha Shewale, Dr. B. M. Pardehsci, Mr. Shatrughna Bhilare and all my colleague, office staff and non teaching Staff.

My Parents, wife Nandini , son Dnyanesh, daughter Vidyulata, brothers and sisters, Nikam family and Relatives......for their love, patience and resolute support...This Journey could not have been completed without their blessings , support and confidence in me.

I earnestly thank all those friends and well wishers whose name could not be included. Finally, I also thank those who have helped me directly/ indirectly towards completion of this dissertation.

Once again, Thank you very much one and all.

22nd April, 2013                      Latesh K. Nikam
समर्पण

उपपानी; नजर दिखी,
आशिवाद दिले,
नजर देखती,
साश दिखी,
नजर छायाबदी;
हाथ दिखा,
फूली दिखी;
आँखें जिंदा दाखीलिला.
न जमे हे खुदे, पूरवा न तेसो दा नजराणा.
क्षणिक, त्या सर्वाना उमाथि,
उत्सविक आर्म्विकास.

उमार्जि

गोपेश्वर निकाम