

Acknowledgement

This piece of work will never be accomplished without many people behind my life for inspiring, guiding and accompanying me through thick and thin to complete my research work. I would like to express my sincere gratitude to all of them. First of all, I am extremely grateful to my supervisors, Dr. Arunkumar L. Patel and Prof. Ashutosh V. Bedekar, for their continuous support, motivation, enthusiasm, constant encouragement, immense knowledge and invaluable guidance that helped me throughout my research work.

I am thankful to Professor (Dr.) Anjali Patel, Head, Department of Chemistry, and former head Professor (Dr.) N. D. Kulkarni for allowing me to use the infrastructural facilities during my research work. I am highly thankful to all the in-charge teachers and instrument committee members of the different instruments for analysis. I am also thankful to the faculties of our department, Prof. S. R. Shah, Prof. P. Padmaja, Prof. Ashish Prajapati, Prof. P.S. Ghalsasi, Prof. Bhavna Trivedi, Dr. Amar Bhallab, Dr. Hemant Soni, Dr. V.K. Singh and other members of teaching staff for their valuable guidance whenever needed.

The financial support obtained in the form of a fellowship from the University Grant Commission (UGC) and Council of Scientific and Industrial Research (CSIR) New Delhi is gratefully acknowledged.

We would like to thank Dr Prakash P. Wadgaonkar of National Chemical Laboratory (NCL), Pune for XPS analysis. We are also grateful to Dr. S. Sahoo of Sun Pharma Pvt. Ltd. for ICP analysis. We thank Dr. Vandana J. Rao, Department of Metallurgical and Material Engineering, M.S. University of Baroda, for SEM and EDX analysis and Dr. Hemant Mande for their help to solve crystallography related problems.

I would like to extend my sincere acknowledgment to the office staff of chemistry department, especially K. J. Rane, Revathi Ganesh, and Kalpeshbhai. I convey special acknowledgement for their help in regards to all official activities related directly or indirectly to my work. Amongst the non-teaching staff members I would like to thank Kirtiben, Makwanabhai, Deepak bhai, Raju bhai, Ninad bhai, Mahesh bhai, Lokhande bhai, Vasant bhai, Dinesh bhai, Rathawa bhai, Dhiru bhai and all others for extending basic help for my research.

Special thanks to Viraj Bhanvadia for making the lab environment lively and enjoyable. Also thank lab colleagues Vinay Kadam, Kiran Nakum, Irfan Saikh, Parita Detroja. I also thank Abhilasha, Neha, Maityree, Yash, Aishwarya and Prachi for their association with me during their dissertation. I thank all of them for their help, co-operation, fruitful discussions and friendly association during my Ph.D. work.

I would like to thank my seniors and friends Dr. Krupa Patel, Dr. Rina Soni, Dr. Harnish Soni, Dr. Vishwanath Junjar, Dr. Ronak Bhatt, Mohini Sadhu, Riddhi Gupta, Rahul Bhatt, Kanu Kataria, Aditya Khanvilkar, Gourav Upadhyay, Blessy Rajan, Hiten Rawal, Ketan Maru, Ishani Sahay, Dhruvi Pithadia and all other research students of the department for their generous help and cooperation. Special thanks to Nisha Khandarkar, Priyanka Salunke, Priyanka Khanvilkar, Aditya Puranik, Krutika Vasava, Vineeta Pillai for fun filled moments during lunch time. It needs a special mention for my friends Snehal, Abhinav, Nipun, Prachi, Nirav, Abhishek and Kamal for their constant source of inspiration, moral support and for everything they did for me, I sincerely thank all of them.

Most importantly, none of this would have been possible without the love and patience of my family. I express my special gratitude to my parents Ashvinkumar Patel and Sumitra Patel, who always believed in me and guided me for being my strength all these years. I thank them for inculcating the values of education which, I think, makes me a better person and a better researcher. I thank my uncle Dr. Bharat Patel and aunty Jagruti Patel and Minaxi Patel for always caring and supporting me at home. I also thank my brothers Deep, Vraj, Harsh and my sister Purva for spreading happiness and liveliness in my life. I specially thank my husband Dhruval for his kind support, encouragement and all the help for making this thesis as it is today. I would also thank all my in-laws Chandrakant Patel and Minaxi Patel for their concern and support. I warmly appreciate the generosity and understanding of my family.

Above all, I owe it all to Almighty God for granting me the wisdom, health and strength to undertake this research task and enabling me to its completion.

Ms. Heta A. Patel