Acknowledgements

I take this opportunity to express my deep sense of gratitude and sincere thanks to my guides Prof. V.L. Gadgeel and Prof. P. Ramakrishnan for their persistent encouragement and invaluable guidance throughout the period of this research work. My association with them has been immensely educative to me in several ways.

I am grateful to Prof. N.S.S. Murti, Head of Metallurgical Engg. Dept., Baroda for his constant encouragement and active interest in my work and also for providing me the laboratory facilities available in the dept. for research.

An innumerable number of people are there to whom I owe my thankfulness for their help, guidance and understanding.

I am extremely grateful to Dr. V.K. Kaushik (R & D Centre, IPCL, Baroda) for his invaluable help in ESCA analysis of samples. I once again thank him for very fruitful discussions during the course of my work on ESCA studies.

I am thankful to Dr. S.G.T. Bhat, Dr. R.V. Jasra, Dr. A.G. Basrur, Dr.S. Unnikrishnan, Dr. K.R. Krishnamurthy and Mr. Rajan Bosco of R & D Centre of IPCL for their help by way of testing and analysis, consultations and library facilities.

My sincere thanks are due to Dr. Manoj Limaye of Geology Dept, MSU, Baroda for his help in SEM work.

I am indebted to M/s Alembic Chemical Works Co. Ltd., Baroda and highly obliged to Mr. J.S. Sheth for extending their facilities and cooperation for freeze-drying experiments.

I am also thankful to Dr. G.H. Thanki, Mr. P.U. Haribhakti and his colleague Mr. Joshi of GSFC, Baroda for helping me in metallography of my samples.

I must thank Dr. M. Ramamurthy, Director, ERDA and DR. M.S. Padbidri, Advisor, ERDA, Baroda for generously extending their testing and research facilities. The help rendered by Mr. U.N. Puntambekar, Mrs. Sangeeta B. Kalkundri and Mr. S.C. Patel of ERDA in conductivity measurements and in co-ordinating the Life-testing of contacts at ERDA is gratefully acknowledged.

I am thankful to Mr. M.A. Mehta, Mr. Raju Karkare and Mr. J.D. Rathod of M/S. Jyoti Ltd, Baroda for arranging Life-testing of contacts in their switchgear laboratory. My thanks are also due to Mr.J.S. Negi (former Jt. Managing Director of Jyoti Ltd.) for permitting me to carry out life testing. An excellent co-ordination by Miss. Smita Kirkire of Materials Group of Jyoti Ltd., in contact testing is worth appreciation.

I am indeed thankful to Mr. V.J. Shrikhande, of Corporate R & D, ABB, Baroda and Mr. Vinay Gaddu (formerly with ABB) for helping me in microhardness measurements. My sincere thanks are also due to Mr. K.V. Vaishampayan and Mr. V.K. Shah of R & D Centre, ABB, for their highly valuable suggestions and help in building up of contact testing facility in our laboratory. Sameway, thanks are also due to Mr. P.K. Patel of GSFC, Baroda and Mr. Nitin Paranjape of M/S. Falcon Enterprise, Baroda for their support in fabricating the contact testing facilities.

I am also thankful to Dr. D.K. Biswas and Mr. Vinay Deshmukh of NMRL, Bombay for extending their full cooperation in image analysis work.

I wish to thank Mr. Mayurbhai Sheth of M/S. Plastichemix Industries, Baroda for sparing their thermal analysis facilities.

My thanks are also due to Prof. V.S. Parekh, Head, Archaeology Dept., MSU, Baroda for permitting me to use their Particle Size Analyser. The necessary guidance and cooperation of Dr. Ajit Prasad of Archaeology Dept. is also gratefully acknowledged. Thanks is also due to Dr. Ketkar of Met. Engg. Dept. of IIT, Bombay for his help in particle size analysis of some samples.

I am also grateful to Mr. N.M. Bhatt and his colleagues Mrs. T.H. Desai and Mrs.S.H.Chawda of the Environmental Engg. Lab. of MSU, Baroda for their help in atomic absorption spectrometry.

I must thank and acknowledge the timely help rendered by Prof. P.B. Desai, Mr. J.P. Khatri and Mr. G.D. Karhadkar of Mechanical Engg. Dept.; Dr. R. A. Vora and Dr. C.R. Jejurkar of Applied Chemistry Dept. and Dr. (Miss) Nilima Kulkarni of Chemistry Dept. of MSU, Baroda. The cooperation from Dr. M.B. Lele of L.D. Engg. College, Ahmedabad is also acknowledged.

My sincere thanks are due to my colleagues Mr. S.C. Khurana and Dr. N.C. Chourasia for their cooperation and encouragement. The cooperation from my colleague Mr. S.N. Soman (QIP candidate at IIT, Bombay) during my visits to IIT is worth appreciation.

I will be failing in my duties if I do not acknowledge the help rendered by my colleagues Miss. Reshma Patel and Miss. Prabha S. Krishnan from time to time during the experimental part of this work.

I am thankful to all teaching and non-teaching staff of the dept. who have helped me in my work.. The assistance by Mr. R.N. Chavan, Mr. R.P. Patel and Mr. S.D. Choudhari in times of need is hereby acknowledged.

Mr. Bharat Nevalkar, UGC Research scholar in Dept. of Chemistry deserves a special thanks for his cooperation at several stages of this work.

Thanks are also due to Mr. Hemang Pandit and his associates for a very neat and decent thesis typing.

Lastly, I express my sincere thanks to my parents and my wife Asha for their moral support and understanding throughout the course of my research work.

M. S. UNIVERSITY, BARODA.

P. B. JOSHI

B Joshi