

## Acknowledgement

I feel privileged to express my deep sense of appreciation and gratitude to my guide Dr. S. K. Dutta, Reader, Metallurgical and Materials Engineering Departmen. Facult of Technology and Engineering, M. S. University of Baroda, Vadodara for suggeoing the topic of research, invaluable guidance and ever-helping nature towards the successful completion of this research work. His ingenuity, knowledge and keen interest in the subject proved to be a constant source of inspiration for me throughout the entire period of this research work.

I take this opportunity to thank Prof. (Dr.) K. B. Pai, Head and Prof. D. K. Basa, Former Head of Metallurgical and Materials Engineering Department, Faculty of Technology and Engineering for extending me the departmental laboratory facilities and constant encouragement throughout the research work. I also thank Prof. B. S. Parekh, Dean, Faculty of Technology and Engineering for extending me the departmental and institutional facilities for research.

I am thankful to Dr. S. B. Sarkar, Sr. Vice President (Metallurgical Services and Quality Assurance), MUSCO Steel Plant, Khapoli for the fruitful discussion and help in deciding the topic of research and Dr. S. S. Gupta, Former Director, Indus Institute of Technology and Engineering, Ahmedabad for his suggestions, encouragement and fruitful discussion on kinetics of smelting reduction of composite pellets.

I am thankful to the management of Tata Steel in general and Dr. T. Mukherjee, Formerly Dy. Managing Director (Steel) in particular for providing the raw material for this study. I am also thankful to Shri Janak Banjara, Director, Kiran Industries, Vatva, Ahmedabad for generously providing the refractory material for lining of induction furnace.

I am extremely thankful to Mr. K. Laxminarayana, Mnaging Director, Hyderabad Wires & Filament Pvt. Ltd., Hyderabad for his generous help by way of supplying tungsten wire for my experimental work. I also thank Dr. G. K. Dey, Scientific officer H, Material Science Division, Bhabha atomic research Centre, Mumbai and Dr. B. venkataraman, Scientist and Head, surface Enginering Group, Defense Metallurgical Research Laboratory, Hyderabad for their help in procuring the tungsten wire.

I am indebted to all the faculty members of Metallurgical and Materials Engineering Department for their co-operation especially to Prof. M. N. Patel for his help in SEM studies, and Prof. (Dr.) N. S. S. Murti, Prof. (Dr.) P. B. Joshi, Mrs. Bharati Rehani and Dr. (Mrs.) Vandana Rao for their help in thermal analysis (TG-DTA) and XRD studies.

I am thankful to all the non-teaching staff of Metallurgical and Materials Engineering Department for their direct and indirect help in course of my research work. I further extend my thanks in particular to Shri R. P. Patel (Rtd.), Shri I. K. Baranda, Shri Rajesh R. Pepavanshi, Shri J. R. Painter, Shri Jignesh Rathawa, Shri R. M. Chavan, Mrs. Kinnari H. Solanki, Shri Jignesh Sindha, Shri M.G. Shelat, Shri S.D. Chaudhari and Shri V. S. Ghatage for their assistance during various stages of experimental work. I am thankful to Mr. M.R. Shah, Editor and Publisher, FOUNDRY Journal, Ahmedabad for his very fruitful suggestion regarding melting in induction furnace and its lining. Thanks are also due to Mr. U. P. Shah, Sr. Manager and Mr. Sanjeev Joshi, Asst. Manger, Inductotherm (India) Pvt. Ltd., Ahmedabad for giving useful suggestions and timely services in maintenance of induction furnace. I sincerely acknowledge the help received from the management of AIA Engineering Pvt. Ltd., Ahmedabad in general and Mr. R. Basu, Asst. Manager, Quality Assurance, AIA Engineering Pvt. Ltd. in particular for doing the spectroscopic analysis of metal samples.

I also express my sincere thanks to the management of Nirma University of Science and Technology, Ahmedabad for permitting me to pursue my Ph.D. work as an external candidate and allowing me to carry out experimental work at M.S. University of Baroda and also to the management of Indus Institute of Technology and Engineering, Ahmedabad for granting me the sabbatical leave for completion of the research work.

My sincere thanks are due to my colleagues of Mechanical Engineering Department, Institute of Technology, Nirma University of Science and Technology, Ahmedabad and also to the colleagues at Indus Institute of Technology and Engineering, Ahmedabad for their help, encouragement and moral support. I will be failing in my duty if I do not acknowledge the help rendered to me by Mr. Abhijat Joshi, Mr. Prakash Patel, Mr. I. R. Patel, Mr. D. V. Nayak and Mr. R. H. Patel of Mechanical Engineering Department, Institute of Technology, Nirma University of Science and Technology, Ahmedabad.

I sincerely acknowledge the help and moral support rendered by Dr. D. P. Bharambe, Applied Chemistry Dept., Faculty of Technology and Engineering and Warden, V.S. Hall, M.S. University of Baroda. I am also thankful to my friends Prof. Sandeep Butee, Asst. Professor, Govt. Engg. College, Pune and Mr. Ravi Waware, Director, IVAR Consultants, Baroda for the help and moral support extended to me.

The goodwill, inspiration and help extended by many friends and relatives whose names are not included here were a great asset in completing the work. Last but not the least I must express my sincere thanks to my (Late) father and mother for their blessings and my wife Babita and sons Aditya and Arpan without whose moral support, understanding and co-operation this work would not have been possible.

R Sal

Indus Inst. of Tech. & Engg. Ahmedabad 5<sup>th</sup> June, 2008

(Rameshwar Sah) Regd. No. 1020 dt 23-09-2002