ACKNOWLEDGEMENT

I would like to express my heart-felt respect and sincere gratitude to my teacher Prof. M. K. Banerjee, former Director, Birla Institute of Technology, Deoghar Campus, for his expert guidance and thorough supervision throughout the entire period of this research work. It would have been an impossible task for me to successfully complete the work had there not been constant monitoring, encouragement and inspiration, of course with an affectionate note from Prof. Banerjee.

I would like to record my respect and convey my indebtedness to my teacher, Prof. M. K. Mitra, the then Dean, FET, Jadavpur University and Professor of Metallurgical and Materials Engineering Department, J. U for his constant encouragement, affectionate mental support and guidance during the entire period of my work.

I am extremely grateful to my teacher Late Dr. D. K. Mukherjee, former Professor of GCECT for inducing and encouraging me to undertake this research work leading to a doctoral degree. I am extremely grief-stricken not to have been able to convey the news of my thesis submission, before he left for the heavenly abode. I am also grateful to Dr. P. K. Ganguly, former Professor of GCECT, who has always been my well-wisher, for his continuously giving me confidence and inspiration for research.

I like to record my deep sense of gratitude to Prof. S. R. Bhadra Chaudhuri, former Principal, GCECT for his graciously enthusing me to undertake this research and rendering all sorts of support from the college end,
during the initial stage. Thanks are also due to Prof. A. K. Banerjee, the then Principal, GCECT for providing me with opportunities for working inside and outside the college whenever needed.

I am greatly indebted to Prof. P. M. G. Nambissan of the Saha Institute of Nuclear Physics where the entire study using Positron Annihilation Spectroscopy had been carried out. He had to spare his invaluable time for my work, sacrificing his busy valuable schedule and giving me opportunity to work with him. I gratefully acknowledge his support and guidance. I had enjoyed working with him for hours together, and would desire undertaking research activities with such a great physicist and philosopher in future also.

My sincere thanks are due to Prof. P. C. Chakraborty, Head, Dept. of Metallurgical and Materials Engineering, J. U., without whose friendly suggestions, inspiration and help in carrying out many experimental works in the laboratories of his Department at J. U., my research work won't have taken a motivated beginning and peaceful ending as well. I am greatly indebted to Prof. P. C. Chakraborty in the truest sense of the term.

It would be my pleasure to convey my sincerest gratitude to Dr. Shubhabrata Datta, former Associate Professor of Metallurgy, Birla Institute of Technology, Deoghar Campus for his generous help and invaluable suggestions for completing the thesis. It would be unfair if I do not express my love and regards for Dr. Partha Dey, former Assistant professor of Production Engineering, Birla Institute of Technology, Deoghar Campus for helping and encouraging me for successful completion of my thesis in its present format. I am grateful and indebted immensely to both of them.

My sincere thanks are also due to Mr. Pallab Dasgupta of USIC, J. U. for his assistance in SEM studies, Mr. Sudipta Mandal, Mr. Ranadhir Basu of Central Research Facility, IIT, Kharagpur and Sri Debdas Roy, former Research Scholar of the Metallurgical and Materials Engineering Department, IIT, Kharagpur for assisting me in TEM studies.

xvi
Prior to submission of my thesis, I must admit the strong influence of Prof. R. C. Das, my bosom friend, Prof. Ranjan Ray, whom I consider to be my elder brother and Dr. Saibal Roy, a renowned astro-physicist, bestowing visible and sometimes invisible best wishes and inspiration for my success in this endeavour. Besides, I must also gratefully acknowledge the encouragement and best wishes showered by Prof. Prithwijit Guha, Dr. S. K. Patra, Dr. (Mrs.) Kaberi Das, Prof. (Dr.) Saikat Maitra, Head of the Department of Ceramic Technology, my teacher colleagues and Prof. (Dr.) P. G. Pal, Officer-in-Charge, Govt. College of Engineering and Ceramic Technology.

I am grateful to my wife, Jaya and our loving son, Sagnik for their love, good wishes, patience and constant encouragement, during the entire period of my research work.

To me, my parents are God incarnate. I owe all my achievements to my parents. Deriving my will power from them, I tried my best with sincerity and devotion and am extremely happy to have completed and dedicated my doctoral work to my parents. As a son, I would further like to be bestowed with their blessings and affection in my life’s onward journey and any word showing gratitude or respect in return would be inadequate because, I believe, parents’ contributions can never be paid back by their wards in the truest sense.

Finally, I thank all those whose names could not be mentioned here. Silently, with their good wishes, they have blessed me for my successful completion of the journey I undertook for the research.