

Acknowledgements

It's my great pleasure to acknowledge the help, support, encouragement and guidance that I have received from several individuals in the course of completion of the thesis. First and foremost, I would like to express deepest gratitude to my supervisor **Prof. Pralay Maiti**, School of Materials Science and Technology, Indian Institute of Technology (Banaras Hindu University), Varanasi for his excellent guidance, enormous patience, constant support and encouragement. I have learnt a lot about how to catch real problems and try to find best possible scientific solutions with new ideas and his way of thinking impressed and motivated me a lot. Spending almost five years in School of Materials Science and Technology, Indian Institute of Technology (Banaras Hindu University) is unquestionably the most valuable time in my life and career. I would like to thank my respected teachers Prof. Dhananjay Pandey, Prof. Rajiv Prakash, Dr. Chandana Rath, Dr. Akhilesh Kr. Singh, Dr. Chandan Upadhyay, Dr. Bhola Nath Pal, Dr. Ashish Kumar Mishra, Dr. Shrawan Mishra, Dr. Sanjay Singh of School of Materials Science and Technology, IIT (BHU), Varanasi, for their help and encouragement to complete my research work.

I am thankful to Prof. Nira Misra, School of Biomedical Engineering, IIT (BHU), for providing various instrumental facilities. I would also like to thank Dr. Dipak Rana, Department of Chemical and Biological Engineering, University of Ottawa, Canada for providing TEM facility.

I gratefully acknowledge the help of Prof. Y. B. Tripathi and Ms. Rashmi Shukla for supporting the animal studies in the Institute of Medical Science (Banaras Hindu University). I would like to thank Prof. Mohan Kumar, Department of Pathology, Institute of Medical Science, Banaras Hindu University, for histopathological studies.

I feel very lucky and proud to have labmates like Dr. Karun Jana, Dr. Dinesh Kumar Patel, Dr. Sunil Singh, Dr. Akhand Pratap Singh, Mr. Arun Kumar Mahanta, Mr. Arpan Biswas, Ms. Anupama Gaur, Ms. Aparna Shukla, Ms. Dipti Saxena, Mr. Sunil Kumar, Mr. Om Prakash, Mr. Ravi Prakash, Mr. Shivam Tiwary, Mr. Aditya Rahane. I am also thankful to Mr. Ishwar Chandra Maurya, Mr. Balavigneswaran Karthikeyan and Dr. Sandeep Gupta for their help, company and co-operation.

I gratefully acknowledge to CSIR-UGC, India for providing me financial assistance and travel support. I would like to thank IIT (BHU) for providing the fund to attend the international conference and workshop. I am thankful to all supporting staffs of the School. I extend my sincere gratitude to CIFIC staff for their nice cooperation during the work period. Finally, I express my sincere gratitude to all my family members for their continuous support and encouragement.

Varanasi

Sudipta Senapati