

ACKNOWLEDGEMENTS

I am extremely dedicated to my guide Dr A G Kunjomana, Professor, Department of Physics, Christ University, Bengaluru, for her wonderful, caring, inspiring, and compassionate mentorship. Her shrewd insights in crystal growth technology, critical thinking and the ability to trivialize the complex concepts were greatly beneficial in preparing manuscripts and improving my studies. From the bottom of my heart, I greatly admire her optimism, generosity and a pragmatic as well as balanced attitude towards life.

I am grateful to Fr (Dr) Thomas C Mathew, Vice Chancellor, Fr (Dr) Abraham V M, Pro-Vice Chancellor, Dr Anil Joseph Pinto, Registrar and the Management of Christ University, Bengaluru, for providing the infrastructural facilities and extending support to carry out this research work.

I would like to express sincere thanks to Dr Tony Sam George, Additional Director and Dr K A Sebastian, Associate Director, Centre for Research for their encouragement. Special acknowledgement goes to Dr S B Gudennavar, Associate Director, Centre for Research, for patiently sharing his valuable expertise and knowledge in various arenas.

Thanks are due to Prof George Thomas, Associate Dean of Science and Head, Department of Physics and all the faculty members, for their valuable suggestion and moral support.

My gratitude goes to Dr S Srikanta Swamy, former Additional Director, Centre for Research, Christ University, a great researcher and wonderful person. I admire his unrelenting energy levels, passion for research and a jovial disposition at all times.

I gratefully acknowledge the Principal, Sr (Dr) Elizabeth C S and Management of Jyoti Nivas College, Autonomous, Bengaluru, for extending their kind assistance and motivation to complete this research work.

I am really fortunate to have a fruitful association with Dr M Umarji, Chairman, Material Research Centre (MRC), Indian Institute of Science (IISc), Bengaluru. I specially thank him for permission to avail laboratory facilities for experimental analysis as well as sharing his wisdom and knowledge. Working with his team, Dr P Suresh, Ms Sukanti Behera, Dr Vinayak B Kamble and Ms Bharathi Rajeswaran was really an enriching experience. I owe very special gratitude to Mr P Rajasekar and Mr Inyalot Jude Tadeo for their assistance in Rietveld refinement analysis.

I am also thankful to Dr K B R Varma, MRC, IISc, Bengaluru for providing the characterization tools such as scanning electron microscope (SEM), energy dispersive analysis by X- rays (EDAX) and transmission electron microscope (TEM). I am indebted to Dr T N Guru Row, Solid State and Structural Chemistry Unit, IISc, for X-ray diffraction studies and staff of Spectroscopy/Analytical test facility centre, IISc, for optical measurements.

I would like to express my heartfelt thanks to the Principal and Dr V Uma, Dean, PG Sciences, Mount Carmel College, Bengaluru for their generosity in permitting the usage of atomic force microscope (AFM) and other electrical/electronic instruments.

A special word of thanks to the staff of Microtrol Sterilization Services Pvt. Ltd, Jigini, Bengaluru, for the gamma ray irradiation process and Netzsch Technologies, Chennai, for thermal conductivity

measurements.

I am bound to express sincere thanks to my research colleagues from the past and present specially, Dr P M Reshmi, Dr Shyamsunder Hegde, Mrs Teena Mathew, Mr Bibin John and Ms Jisha Abraham for their warm hearted co-operation in providing a stimulating and enjoyable environment.

My deepest gratitude goes to my parents for their endless affection, moral support and encouragement throughout my studies from childhood and the faith they had in me.

Indeed, I am very much fortunate to receive the unflagging love, patience and continual support of my husband Mr Ajayakumar, daughter Ms Rocily Deepthi and son Mr Dejo Ajay, for completing this great academic endeavour. I truly appreciate all that they have done for me. I could not have reached my goals without their help and support at all times. They made me feel special and comfortable even when times were tough and challenging.

Finally, I thank the almighty for giving me the strength and patience to work through all these years and accomplishing this great achievement. Thank you Lord, for always being there for me.

THANKAMMA GEORGE