## ACKNOWLEDGEMENTS

It is my privilege to express a deep gratitude to my research supervisor, **Prof. M. Srinivas** for introducing me to the world of luminescence phenomenon. I would like to express my deepest gratitude for their unwavering support, invaluable guidance, and exceptional mentorship throughout the course of my doctoral research. I am also thankful for his patience, encouragement, and the freedom he provided, allowing me to explore new ideas and approaches. He has not only been a mentor but also a source of motivation, pushing me to achieve my best and to persist even in the face of challenges. Thank you, once again, for being an exceptional mentor and for believing in the potential of this research. Your guidance has not only shaped my academic journey but has also been contributory in my personal and professional growth. This work would not have been possible without his constant supports.

I would like to extend my honest gratitude to **Dr. K. V. R. Murthy** for their invaluable contributions and thoughtful mentorship throughout the course of my doctoral research. He played a pivotal role in shaping the direction of my research, offering perceptive insights, and providing constructive feedback at every stage of the process. I am particularly appreciative of his collaborative approach, which allowed for a free exchange of ideas and the exploration of innovative methodologies. Furthermore, I am greatful for his patience, encouragement, and dedication to my academic growth. I am also very much thankful of him for carrying out the PL and TL characterizations during my Ph.D.

I express my warm gratitude to Head, **Prof. P. K. Jha**, and the **DRC members**, **Prof. P. K. Mehta**, **Dr. P. H. Soni**, and **Dr. M. Sarkar**, Department of Physics, The M. S. University of Baroda, Vadodara and **Prof. Sunil Chaki**, Department of Physics, Sardar Patel University, Vallabh Vidyanagar for providing necessary infrastructure, resources, and valuable suggestions to accomplish my research work. I am greatful to **My Dear Teachers** of the Department of Physics for their encouragements. I am thankful to **Non-Teaching Staff** of the Department of Physics for their support.

My sincere thanks to **Prof. Haribhai Kataria**, Dean, Faculty of Science, The M. S. University of Baroda, Vadodara for the immense help I received from him. I am also greatful to Department of Physics, The Maharaja Sayajirao University of Baroda for providing infrastructure and research facility for doing my research.

I would like to express my sincere gratitude to my seniors **Dr. Nimesh Patel** and **Dr. Vishwanth Verma** for their invaluable guidance and unwavering support during my Ph.D. journey. **Dr. Nimesh Patel** played a pivotal role in my academic and personal development by

generously sharing their expertise, insights, and experiences. I am particularly appreciating his willingness to engage in in-depth discussions, which not only enriched my research but also broadened my understanding of the subject matter. I am very much thankful of his moral support during my research.

I am highly obliged to my dear friends **Mr. Nilesh Mavadiya, Mr. Atul Pandavadara, Mr. Ravi Mavadiya** and **Mr. Gopal Mevada** for their constant support, whenever and whatever I needed during my research.

I would like to thank my seniors and fellow researchers from the department, Dr. Ashwini Mahadik, Ms. Heli Mistry, Ms. Dhruti Bhagora, Dr. Kevil Shah (Applied Physics Department), Dr. Bhargav Soni, Dr. Jaimin Acharya, Dr. Chaitnya Limberkar (S. P. University), Mr. Ratan Kumar Singh, Mr. Shardul Vadalkar, Mr. Rushikesh Pokar, Mr. Brajesh Bhagat, Mr. Kishan Mali, Mr. Sourav Jana, Ms. Sitara Manon and Ms. Manali Pancholi, Ms. Mahatta Mam (TAP) for their constant supports.

I would like thank the Assistant Professors from the Physics Department, **Dr. Ketan Chaudhari, Dr. Rajnikant Makwana,** and **Mr. Rakesh Chauhan** for their immense support during my research.

I am very much thankful of my M.Sc. friends Mr. Akash Hingu, Mr. Bhavesh Chavda, Mr. Kaushal Tailer, Mr. Kaushal Parikh, Mr. Dashrath Vadekhaniya, Mr. Bhavesh Hadiya, Mr. Hemang Tanna, Mr. Bhavin Moida, Mr. Khyati Rohit, Ms. Tithi Joshi, Mr. Jalpesh Dave, and Mr. Hitesh Naghera for their support during my research.

I would like to thank my B.Sc. friends, Ms. Monika Gajera, Ms. Dixita Akbari, Ms. Roshni Ponkiya, Ruchita Sarvaiya, Mr. Himanshu Kotadiya, Mr. Mayur Borad, Mr. Akib Girach, and Mr. Rajan Meta, for their support during my research.

I would like to thank to my hostel friends, **Pravin Patil, Vijay Joshi, Jignesh, Kaushal Agheda (Special thanks), Vishwajit Chavda, Punit bhai, Jayvadan bhai, Meet, and Jaydeep Sharma,** for staying happy with me during my hostel life.

I am very greatful of **Mr. Paresh Bosmiya**, for his believe in me and direct me to move forward in the field of physical science.

I am greatful to **Dr. Mukul Gupta**, UGC-CSR, Indore Center for providing XRD characterization facilities during my research. I am very much greatful to **Prof. D. Harnath** and **Ms. M. Rakshita**, NIT Warangal, for providing the temperature-dependent PL facility during my research. I am also thankful of **Dr. Naveen Chauhan** and **Ms. Malika Singhal**, Physical Research Laboratory, Ahmedabad, for their immense support for carrying out the TL characterization and in TL data analysis. I would like to thank **Dr. Naveen Acharya**, Applied

Physics Department, The M. S. University of Baroda, for providing the XRD facility. My sincere thanks to **Dr. S. N. Achary,** BARC Mumbai, for his immense help in XRD data analysis.

I would like to acknowledge the people who mean world to me, My late father **Jethabhai**, my mother **Gangaben**, and my dear brother **Dinesh**.

Thank you very much to all the people, the reason and the conditions that take part during my research, who help me and make me strong to live a healthy life.

Naresh Degda