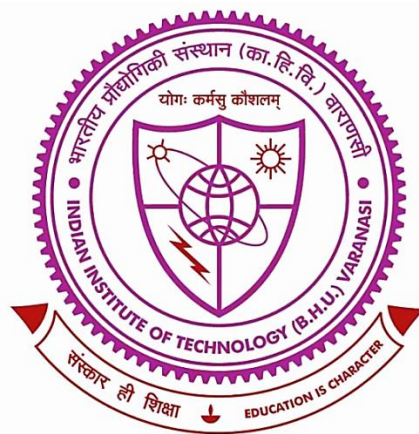


# Studies of Palladium Nanoparticles and their Bimetallic Composite for Electrochemical Sensing Application



Thesis submitted in partial fulfilment for the  
Award of Degree

**DOCTOR OF PHILOSOPHY**

By

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**2024**

## ACKNOWLEDGEMENTS

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The work presented in this thesis would not have been possible without my close association with many peoples who were always there when I needed them the most. I take this opportunity to acknowledge them and extend my sincere gratitude for helping me make this thesis a possibility. At this moment of accomplishment, first of all I would like to pay the homage to the founder of Banaras Hindu University, Pandit Madan Mohan Malaviya ji, who made this glorious temple of education to realize spiritual, technical and scientific knowledge about this vast existing universe.

I embrace the opportunity to express my deep sense of gratitude to my supervisor **Dr. Manisha Malviya**, Associate Professor, Department of Chemistry, IIT (BHU), Varanasi for her constant guidance, valuable suggestions and kind encouragement during my association with her research group. Her encouragement, constant support, intellectual stimulation, perceptive guidance, immensely valuable ideas, and suggestions from the initial to the final level enabled me to develop an understanding of the subject. Her scholarly suggestions, prudent admonitions, immense interest, constant help and affectionate behavior have been a source of inspiration for me. Her suggestions will remain with me as an inexhaustible source of scientific learning throughout my life.

I wish to extend my sincere thanks to “Prof. Sundaram Singh” (Head) and “Prof. Y. C. Sharma” (former Head) of Department of Chemistry, IIT (BHU), Varanasi for providing me the necessary resources to enable me to complete this research work. I am also thankful to all the teaching and non-teaching staffs of Department of Chemistry IIT (BHU) for their kind support and for extending all required facilities to carry out my research work smoothly.

I would like to express my sincere and whole hearted gratitude to Prof. Y.C. Sharma, Prof. D. Tiwari, Prof. K.D. Mondal, Prof. Sundaram Singh, Dr. I. Sinha, Dr. Asha Gupta and

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Dr. Arindam Indra, Department of Chemistry, IIT (BHU), Varanasi, for discussion during seminars and valuable suggestions given by them. I am indeed obliged and sincerely thankful to my RPEC members **Prof Y.C. Sharma**, and **Dr. Preetam Singh** (Department of Ceramic Engineering), IIT (BHU) for his guidance and untiring attention right from the inception to the successful completion of assigned research work.

I am thankful to the unknown reviewers who have rejected my papers several times in some of the international conferences and journals. The comments that they provided helped to polish our articles in better shape. But the bigger and nobler cause of thanking them is that the rejections have equipped me with high level of patience and helped me a lot to exercise/implement my spiritual thoughts in practice. My acknowledgement will never be complete without the special mention of my lab seniors who have taught me the lab culture and have lived by example to make me understand the hard facts of life. I would like to acknowledge Dr. Neetu Verma, Dr. Maneesha Pandey, Dr. Salman, Dr. Suresh Pandey Department of Chemistry, IIT (BHU), Varanasi for their encouragement and valuable suggestions during my research period. My sincere thanks to my senior Dr. Neetu Verma, Sarvatej Kumar Maurya, Amisha Soni for their motivation and throughout support from the initial days of my Ph.D. My heartfelt thanks to my fellow class mates and lab mates Chitra Singh, Kuldeep Kumar Maurya, Manjeet Singh, Dinesh Prajapati, and Rishabh Mishra for always being there and bearing with me the good and bad times during my wonderful days of Ph.D. Also, I am thankful to my juniors specially Nitin, Subrata, Ashish, Rajesh, Anshuman Tyagi, for their all kind of support. Acknowledgements It's my fortune to gratefully acknowledge the support of some special individuals. Words fail me to express my appreciation to Vishal Singh and Amit Bar (SMST), Manish Sharma (Department of Medicine

---

Chemistry, BHU) for their support, generous care and the homely feeling at hostel. Their association has made my stay in IIT (BHU) a pleasurable and memorable experience. My outing and shopping with them will be etched permanently in my memory. They were always beside me during happy and hard moments to push me and motivate me. My fast friends Dr. Gautam, and Tushar...the list is endless thanks to one and all.

I am also thankful to all, to whom I could not mention here who helped me directly or indirectly throughout the work. I am thankful to all non-teaching staff of the Department Mr. Rambish Gond (Jr. Asst.), Mr. Abhishek Shukla (Sr. Asst.), Mr. Amit Anand Singh, Mr. Param Hans Ram, Mr. Pooran Singh Rana, Mr. Jagdish Kumar, Mr. Prakash Narayan Pandey, Mr. Rajesh Kumar, Mr. Sundip Kumar, and Mr. Amit their cooperation at all levels.

I am thankful and indebted to IIT (BHU) for providing me financial support during my research work. I gratefully acknowledge the facilities provided by CIFC, IIT (BHU), Varanasi for doing various characterization of samples.

I gratefully acknowledge the MHRD, Govt. of India for providing me the necessary funding and fellowship to pursue research work.

I express my indebtedness to my grandparents, Late Smt. Kamla Devi and Mr. Jagdeesh Singh, my parents, Smt. Maheshwari Devi and Mr. Ashok Kumar, my brothers Anshu Chauhan and Pushendra Chauhan for their love, affection and moral support during every moment in my life.

This work would not have been possible without the grace of the Almighty “Lord Ganesha and Baba Kashi Vishwanath”.

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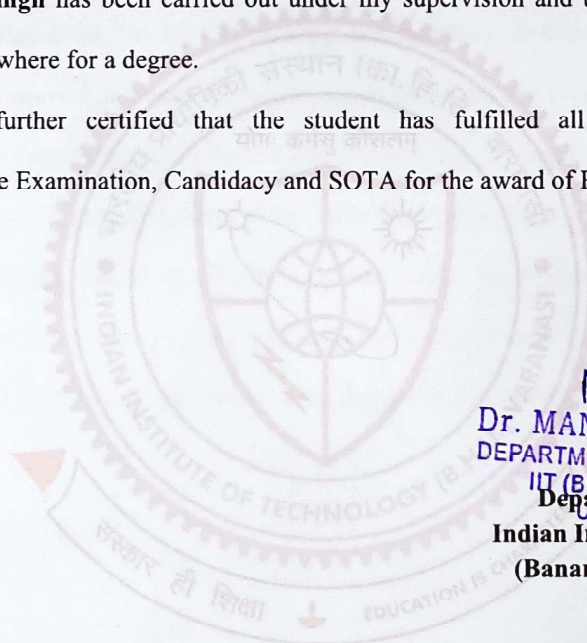
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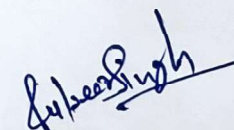
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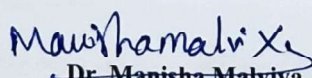
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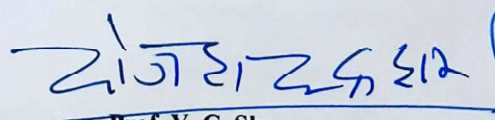
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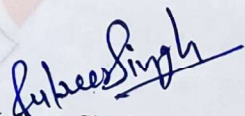
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## List of Symbols/Abbreviations

<b>PBS</b>	: Phosphate buffer solution
<b>CPE</b>	: Carbon paste electrode
<b>K<sub>2</sub>PdCl<sub>4</sub></b>	: Potassium tetrachloropalladate (II)
<b>PdNPs</b>	: Palladium nanoparticles
<b>NPs</b>	: Nanoparticles
<b>f-MWCNT</b>	: Functionalized multiwall carbon nanotube
<b>AA</b>	: Ascorbic Acid
<b>Fc</b>	: Ferrocene
<b>Fcmc</b>	: Ferrocene monocarboxylic acid
<b>Dmfc</b>	: Dimethyl ferrocene
<b>3-APTMS</b>	: 3-Aminopropyltrimethoxysilane
<b>EETMS</b>	: 2-(3,4-epoxycyclohexyl) ethyltrimethoxysilane
<b>PVP</b>	: Polyvinylpyrrolidone
<b>HRTEM</b>	: High Resolution Transmission electron microscopy
<b>HRSEM</b>	: High Resolution Scanning Electron Microscope
<b>XRD</b>	: X-ray Diffraction
<b>AFM</b>	: Atomic Force Microscopy
<b>NTA</b>	: Nitrilotriacetic Acid
<b>NC</b>	: Nitrogen doped carbon
<b>SAED</b>	: Selected area electron diffraction
<b>XPS</b>	: X-ray photoelectron spectroscopy
<b>CV</b>	: Cyclic Voltammetry
<b>DPV</b>	: Differential pulse voltammetry
<b>EIS</b>	: Electrochemical impedance spectroscopy
<b>R<sub>ct</sub></b>	: Charge transfer resistance

## List of Symbols/Abbreviations

<b><math>\theta</math></b>	: Angle (degree)
<b><math>\mu</math></b>	: Micro
<b><math>\mu\text{l}</math></b>	: Microliter
<b><math>\mu\text{m}</math></b>	: Micrometer
<b><math>\mu\text{M}</math></b>	: Micromolar
<b>mM</b>	: Millimolar
<b>nm</b>	: Nanometer
<b><math>\mu\text{A}</math></b>	: Microampere
<b>s</b>	: Second
<b>min</b>	: Minute
<b>v</b>	: Scan rate
<b>E</b>	: Potential
<b>V</b>	: Volt
<b>mV</b>	: Millivolt
<b>eV</b>	: Electron Volt
<b>i</b>	: Current
<b><math>I_p</math></b>	: Peak current
<b><math>E_{pa}</math></b>	: Anodic peak potential
<b><math>E_{pc}</math></b>	: Cathodic peak potential
<b>k<math>\Omega</math></b>	: Kilo-ohm
<b><math>^{\circ}\text{C}</math></b>	: Degree Celsius
<b>LOD</b>	: Limit of detection
<b>NADH</b>	: 1,4-Dihyronicotinamide adenine dinucleotide
<b>DA</b>	: Dopamine
<b>UA</b>	: Uric acid

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