Dr Gazala Ruhi

(Assistant Professor)

Department of Chemistry,

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EDUCATIONAL BACKGROUND

Academic Qualifications:-

Examination Passed	Year of Passing	University/Board	Class Obtained	% marks Obtained
Ph.D	2010	Barkatullah University		
M.Sc.	2002	Vinoba Bhave University	1st	67
B.Sc.	1998	Vinoba Bhave University	1st	67.1
Intermediate (10+2)	1995	C.B.S.E	1st	71
S.S.C. (10th)	1993	B.B.	1st	74

WORK EXPERIENCE

Research Experience

- My Ph.D work in Advanced Materials and Processes Research Institute (CSIR-AMPRI), Bhopal was to study of the corrosion behavior of various steel substrates (low carbon mild steel, 9Cr-1Mo ferritic steel, 304L stainless steel). High temperature oxidation behaviour of 9Cr-1Mo steel and INCONEL 625 was also studied in detail. In order to protect these substrates from corrosion, nano ceramic coatings (alumina and zirconia) were developed using sol-gel method. These coatings were applied to the substrates and corrosion studies were carried out in simulated sea water environment and industrial atmospheric conditions where corrosion is accelerated in presence of corrosive salts and hu-

midity. High performance coatings were characterized by various characterization techniques e.g. Fourier Transform Infrared Technique (FTIR), X-ray diffraction (XRD) method, Scanning Electron Microscopy (SEM) equipped with EDAX, elemental mapping, Atomic Force Microscopy (AFM). Electrochemical characterizations were carried out using potentiodynamic polarization and Electrochemical Impedance Spectroscopy (EIS). I am well known to these characterization techniques and their interpretation. I have **1 patent and 11 publications in esteemed international/national journals** from my Ph.D work.

- I worked in National Physical laboratory (CSIR-NPL), New Delhi as a post doctoral fellow from April, 2012 to March 2015. My research work was basically focused on the synthesis of conducting polymer based nano composites for designing of intelligent (self healing) coatings for corrosion protection of steel substrates in saline conditions and accelerated corrosive conditions. Intelligent coatings are new age of smart coatings with advanced anticorrosive properties and. During my research work, I worked with various characterization techniques like FTIR, XRD, Field Emission Scanning Electron Microscopy (FESEM), Thermogravimetric Analysis (TGA), Differential Scanning calorimetry (DSC), Transmission Electron Microscopy (TEM), UV-Visible spectroscopy etc. I am well versed with electrochemical characterizations like potentiodynamic polarization, EIS, Salt spray method (ASTM B117) and physico-mechanical study of coatings (scratch test, bend test, light fastness test). I have **1 patent**, **1 book chapter and 10 publications in esteemed international journals.** My patent work on smart coatings was also received **gold medal under DST-Lockheed Martin Innovation Growth Programme, 2014.**

Research and Teaching Experience

- CSIR–Research Associate (RA) in CSIR–National Physical Laboratory (2nd April 2012–31st March 2015).
- Assistant Professor (ad-hoc) in Maitreyi College, University of Delhi (19th January 2016–till date). Topics taught in physical chemistry: Kinetic theory of gases, Liquid state, Solid state, Phase Equilibria, Electrochemical Cells, Electrolytic conductance, Spectroscopy, Chemical Kinetics, and Photochemistry.

College Responsibilities

1. Member of "Centre for Research (CFR) and Advisory Committee for Professional Grooming(ACPG), Maitreyi College, University of Delhi.
2. Assistant Editor of the Journal “Vantage: Journal of Thematic Analysis”.
3. Member of Internal Quality Assurance Cell (IQAC), Maitreyi College.
4. Department coordinator of Avgaahan: The interdisciplinary fest of Maitreyi College (during 2020-2022).
5. Member of the organizing committee in

   (I) National Conference on "Biotechnology in present era: impact on human life and environment", organized by Maitreyi College in collaboration with Department of Biotechnology, Govt, of India (under the DBT-CTEP Programme) (23rd August 2019)

   (II) International Interdisciplinary e-Conference, “Sustainable Future for Humanity: The New Learning Curve (Under the aegis of Avgaahan, International Interdisciplinary Academic Fest), (24th February 2021).

   (III) International Conference, “Recent Trends in Drug Discovery and Development” organized by the Department of Chemistry, Maitreyi College, University of Delhi (8-9 October 2021).

   (IV) National Conference on The Expanding Frontiers of Knowledge organized by the Centre for Research, Maitreyi College (11-13th August 2022).

Research Contribution at Undergraduate Level

I) Supervised students for poster presentations for National Conference, "Nanoscience-Opportunities and Challenges" organized by Department of Chemistry, Maitreyi College (19-20th February 2016)

II) Organized, a winter training program for students, on "Utilization of waste plastic" at CSIR-NPL from 19th-24th December 2016. Conducted short-term interdepartmental project (under DBT Star college status) for students of chemistry and physics departments.

III) Mentored students for poster presentation in National Conference "Environmental sustainability in wastewater remediation: current status and future prospects (ESWR-2017) organized by Sri Venkateswara College (19-20 January 2017).

IV) Supervised students of Chemistry Hons for a short-term project "Synthesis and characterization of magnetic colloidal fluid (ferrofluid)", during 20th March -3rd April, 2017 at Maitreyi College, University of Delhi.

V) Mentoring ongoing Annual Research Project (ARP, 2022) entitled "Sustainable Nano Polymeric Composites/Hybrids for Wastewater Treatment", (student participation: Nayasha Mallik, Sneha Kohli, Aleena Shakreen, Panchami Murlidharan, Anjali Bhadauriya, Riti, Mahima; Students of Chemistry Hons IInd Year)

VI) Mentored 4 Summer Internship Projects (SIPs) during 2018-2021. (Short-term projects of two months)

i) "Functionalized nano biopolymer for designing of sustainable crop protection formulations", (2021), (Student participation: Riya Nimbekar, Sakshi, Leesha, Diksha, Shreya Mandal; Students of Chem Hons. IInd year).

ii) "Nanoscale Perspective of Coronavirus", (2020), (Student participation: Aditi Singh, Harshita Sharma, Muskaan, Sakshi Sharma, Stuti Dureja; Students Chemistry Hons IInd year)

iii) "Eco-friendly magnetic biopolymer nanocomposites for removal of heavy metals from wastewater" (2019), (Student participation: Vani Sharma, Yamini Chaddha, Arushi Rawat, Tanisha Singh, Simran Kapoor; students of Chem Hons IInd year). ***Published work*** *in Vantage: Journal of Thematic Analysis A Multidisciplinary Publication of Centre for Research, Maitreyi College, University of Delhi, April 2020, Volume 1, Issue 1.*

iv) "BIOPLASTICS: Green Alternative for Sustainable Development" (2018), (student participation: Rupanjili Singh, Ekta & Anshul; students of Chemistry Hons. IInd year)

ACHIEVEMENTS

- Qualified **CSIR-NET-JRF** in the year 2003.
- Qualified **GATE** in the year 2003 (percentile score 90.77).
- Awarded **CSIR-RA** in the year 2012.
- "Wear and electrochemical characterization of sol-gel alumina coating on chemically pre-treated mild steel substrate", Received **best paper award in AMPRI, Bhopal, 2006-2007**.
- "Self healing anticorrosive coatings and the process for the preparation thereof". **US2015/018304 A1 (Pub. Date July 2, 2015)**. Innovation has received **gold medal under DST-Lockheed Martin Innovation Growth Programme, 2014.**

PUBLICATIONS

1. "Enhanced anticorrosive properties of tailored poly(aniline-anisidine)/chitosan/SiO_2 composite for protection of mild steel in aggressive marine conditions", Pradeep Sambyal, **Gazala Ruhi**, S.K. Dhawan, B.M.S. Bisht, S.P. Gairola, *Progress in Organic Coatings* 119 (2018) 203–213.
2. "Conducting Polymer/Bio-Material Composite coatings for corrosion Protection", Pradeep Sambyal, **Gazala Ruhi**, Monu Mishra, Govind Gupta, Sundeep K Dhawan, *Materials and Corrosion*. 69 (2018) 402–417.
3. "Novel Polypyrrole/Gum Acacia Composite Coatings with Advanced Corrosion Resistance Properties", **Gazala Ruhi**, Pradeep Sambyal, Hema Bhandari and Sundeep K. Dhawan, *Advanced Materials Letters* , 3 (9) (2018) 158-168.
4. "Evaluation of an Advanced Self Healing and Highly Durable Corrosion Protective Epoxy Coatings Modified with Poly(Aniline-co-pentafluoroaniline)/ZrO2 Nano Composites on Mild Steel", B.M. Singh, H. Bhandari, **Gazala Ruhi**, S.P. Gairola, S.K. Dhawan, *Current Smart Materials*, Bentham Science 2 (2) (2017) 130-145.
5. "Oxidation behavior of sol–gel zirconia coated 9Cr–1Mo ferritic steel in air atmosphere", I.B. Singh, **Gazala Ruhi**, O.P. Modi, M. Singh, *Indian Journal of Chemical Technology*, 23 (2016) 533–537.
6. "Hot Corrosion Behaviour of Sol-Gel Alumina Coated IN625 Alloy in Alkali Metal Chlorides and Sulphates Salt Deposit Systems", **Gazala Ruhi**, G.K. Gupta, O.P.Modi , I.B. Singh, *Journal of Thin Films, Coating Science Technology and Application*, 3, 1 (2016) ISSN: 2455-3344.
7. "Designing of Smart Coatings of Conducting Polymer Poly(aniline-co-phenetidine)/SiO_2 Composites for Corrosion Protection in Marine Environment." P. Sambyal, **Gazala Ruhi**, R.Dhawan and Sundeep K. Dhawan, Surface and Coatings Technology, Volume 303, Part B, 15 October 2016, Pages 362–371.
8. "Eco Friendly Chitosan: an Efficient Material for Water Purification", H. Chopra, **Gazala Ruhi,** The Pharma Innovation Journal, 5, 1 (2016) 92-95.
9. "Advanced anti corrosive properties of poly(aniline-co-o-toluidine)/flyash composite coatings". P. Sambyal, **Gazala Ruhi**, H. Bhandari and S. K. Dhawan. *Surface and Coatings Technology,*

272, (2015) 129-140.

10. "Chitosan-polypyrrole-SiO_2 Composite Coatings with Advanced Anticorrosive Properties". **Gazala Ruhi**, O.P.Modi, S.K. Dhawan, *Synthetic Metals* 200 (2015) 24-39.
11. "Corrosion Resistant Polypyrrole/flyash Composite Coatings Designed for Mild Steel Substrate". **Gazala Ruhi**, H. Bhandari, S.K.Dhawan, *American Journal of Polymer Science*, 5 (1A) (2015) 18-27.
12. "Development of sol-gel alumina coating on 9Cr-1Mo ferritic steel and their oxidation behavior at high temperature". I B Singh, O. P. Modi and **Gazala Ruhi**, *Journal of Sol-gel Science and Technology*, 2015, 1-7.
13. "Designing of Corrosion Resistant Epoxy Coatings Embedded with Polypyrrole/SiO_2 Composite". **Gazala Ruhi**, H. Bhandari and S.K. Dhawan, Progress in Organic Coatings 77 (9) 2014, 1484.
14. "Technical Note- Hot Corrosion Resistance of Nano-Structured Sol-Gel Alumina Coated 9Cr-1Mo Ferritic Steel in Air/Salt Environments". **Gazala Ruhi**, O.P. Modi, M. Singh, A.K. Khare and I.B. Singh, Corrosion 70 (2) 2014, 130.
15. "Hot Corrosion Behaviour of Sol-Gel Nano Structured Zirconia Coated 9Cr-1Mo Ferritic steel in Alkali Metal Chlorides and Sulphates Deposit Systems at High Temperatures." **Gazala Ruhi**, O P Modi and I.B. Singh, *Journal of Surface Engineered Materials and Advanced Technology* 3 (01) 2013, 55.
16. "Characterization of Corrosion Resistance Properties of Sol-Gel Alumina Coating in Mine Water Environment", **Gazala Ruhi**, O.P. Modi, A.K. Jha and I.B. Singh, *Indian Journal of Chemical Technology* 16 (3) 2009, 216
17. "Effect of Sintering Atmosphere on the Corrosion and Wear Resistance of Sol-Gel Alumina-Coated Mild Steel Surface." **Gazala Ruhi**, O.P.Modi, I.B.Singh, *Corrosion* 65 (11) 2009, 758.
18. "Pitting of AISI 304L Stainless Steel Coated with Nano Structured Sol-Gel Alumina Coatings in Chloride Containing Acidic Environments." **Gazala Ruhi**, O.P. Modi, I.B. Singh, *Corrosion Science* 51, 2009, 3057.
19. "Corrosion Behaviour of Nano Structured Sol-Gel Alumina Coated 9Cr-1Mo Ferritic Steel in Chloride Bearing Environments." **Gazala Ruhi**, O.P. Modi, I.B. Singh, *Surface and Coatings technology*, 204, 2009, 359.

20. "Effect of Sintering Temperatures on Corrosion and Wear Properties of Sol-Gel Alumina Coatings on Surface Pre-treated Mild Steel." **Gazala Ruhi**, O.P. Modi, A.S.K.Sinha and I.B. Singh. *Corrosion Science* 50, 2008, 639.
21. "Wear and Electrochemical Characterization of Sol-Gel Alumina Coating on Chemically Pre-treated Mild Steel Substrate", **Gazala Ruhi,** O.P. Modi, I.B. Singh, A.K. Jha and A.H. Yegneswaren. *Surface and Coatings Technology* 201 (3) 2006, 1866.

BOOK and BOOK CHAPTERS

1. "Corrosion preventive Materials and Corrosion Testing", CRC Press, Taylor & Francis Group.
2. Chapter: "Conducting polymer nano composite epoxy coatings for anticorrosive applications". Book : Modern Electrochemical Methods in Nano, Surface and Corrosion Science, InTech Publications, ID 38425, 2014.

PATENTS

- An improved Sol-Gel Process for the Nano-Structured Alumina Coatings. **Indian Patent 298935. (Grant Date 18-07-2018)**
- "Self healing anticorrosive coatings and the process for the preparation thereof". **US2015/018304 A1 (Pub. Date July 2, 2015)**.