

CURRICULUM VITAE

Professor (Dr.) Sagar D. Delekar

M.Sc., Ph.D., PDF-USA

Department of Chemistry, Shivaji University, Kolhapur 416 004 (MS) India.

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Educational Credentials

Sr. No.	Fellowship/Degree/Competitive Examination	University	Year of Passing	%
1.	Raman Post-doctoral Research Fellowship Project Supervisors: Nobel Laureate Sir Harold Kroto and Prof. Naresh Dalal Project Title: <i>Sensitization of Nanoporous Oxide/ Carbon Nanohybrids by Quantum Dots for Solar Energy Harvesting</i>	Florida State University, Tallahassee, (Florida), USA	2015 - 2016	---
2.	Summer Research Fellowship Project Supervisor: Prof. S. Vasudevan Project Title: <i>Synthesis, Characterization and Catalytic Activity of Metal-doped Titania Nanoparticles</i>	Indian Institute of Science, Bangalore, India	2010	---
3.	Ph.D. (Solid State Chemistry) Thesis Supervisor: Prof. P.P. Hankare Thesis Title: <i>Synthesis, Characterization and Opto-electronic Studies of Mixed Cadmium Chalcogenide Thin Films</i>	Shivaji University, Kolhapur (MS) India	2006	---
4.	M.Sc. (Inorganic Chemistry)	- do -	2001	65.95
5.	NET (Chemical Sciences) [Twice]	CSIR, New Delhi	2001, 03	--
6.	SET (Chemical Sciences)	Pune University	2002	--
7.	B.Sc. (Chemistry)	Bhogawati Mahavidyalaya, Kurukali, Kolhapur	1999	71.25

Professional Experiences

Sr. No.	Positions Held with Organization / Institution	Period		Nature of Duties and Responsibilities
		From	To	
Professional Experience				
1.	Professor, Department of Chemistry, Shivaji University, Kolhapur.	April 2016	Till Date	Teaching, research and extension activities for post-graduate & M.Phil./Ph.D. degrees
2.	Associate Professor, Department of Chemistry, Shivaji University, Kolhapur.	April 2013	April 2016	Teaching, research and extension activities for post-graduate & M.Phil./Ph.D. degrees
3.	Assistant Professor, Department of Chemistry, Dr. Babasaheb Ambedkar M. University, Sub-campus Osmanabad.	June 2005	April 2013	Teaching, research and extension activities for post-graduate & M.Phil./Ph.D. degrees
4.	Lecturer, Department of Chemistry, Shivaji University, Kolhapur	August 2002	June 2005	Teaching, research and extension activities for post-graduate degrees

Other Services Provided to the Students and Home Institutions

Sr. No.	Position Head with Organization / Institution	Period		Nature of Duties and Responsibilities
		From	To	
1.	Co-ordinator, Institution's Innovation Cell (IIC), Shivaji University, Kolhapur.	June 2023	Till date	Fostering innovation, startups and entrepreneurship of the stakeholders
2.	Co-ordinator, University-Industry Interaction Center, Shivaji University, Kolhapur.	May 2022 (2018)	Till date (2020)	Strengthening partnership between educational domain and industrial domain for mutual benefits
3.	Co-ordinator, Research Colloquium, Shivaji	Oct	Till	Conducting the lectures of the teachers for further

	University, Kolhapur.	2016	Date	development of university research.
4.	Chief Reactor/Rector, Boys Hostel, Shivaji University, Kolhapur	July 2016	Dec 2020	Administrative activities such as admission process, smooth running of hostel events.
5.	Chairman, M.Sc. Examination, Shivaji University, Kolhapur	July 2016	Till Date	Examination related activities such as paper setting, evaluation, etc
6.	Departmental Placement Officer Shivaji University, Kolhapur	July 2016	Till Date	On-campus/off-campus drive for the student's placements in the different sectors
7.	Head, Department of Chemistry, Dr. Babasaheb Ambedkar Marathwada University, Sub-campus Osmanabad	Oct 2005	Dec 2011	General Administration, Admission and Examination Processes, Academic Development, Account and Audit, etc.

Courses Taught

Sr. No.	Course with Paper Titles	Major Topics/Chapters Taught	Mode of Teaching
Ph.D./M.Phil. Degree (Course Work Syllabus)			
1.	Selected Topics in Inorganic Chemistry	Inorganic Nanomaterials and Their Applications, Co-Ordination/Organometallic Chemistry	L+ ICT
2.	Recent Trends in Chemistry	X-ray diffraction, XPS, EDX and SEM/TEM	L+ ICT
M.Sc. Chemistry/Applied Chemistry Degree (Post-graduate Degree Course Syllabus)			
1.	Energy & Environ. Chemistry	Energy Conversion Devices (Solar devices, Fuel cells)	L+ ICT
2.	Chemistry of Inorganic Materials	Solid State Chemistry, Nanomaterials (Synthesis, characterization, properties, applications),	L+ ICT
3.	Instrumental Techniques	XRD, Mossbauer and ESR spectroscopy	L+ ICT
4.	Inorganic Chemical Spectro.	Molecular Symmetry & Group Theory, IR & Raman Spectroscopy	L+ ICT
5.	Coordination Chemistry-I	Electronic spectra of Transition Metal complexes	L+ ICT
6.	Inorganic Chemistry-II	Main Group Compounds, Non-Aqueous solvents	L+ ICT
7.	Inorganic Chemistry-I	Metal-ligand Equilibria, Coordination & Nuclear Chemistry	L+ ICT
8.	Practical courses	Nanomaterial's synthesis, Stability constant determination, Alloy-ore analysis, complexes preparation with their characterization, etc	Practicals

Research Thrust Areas

- Designing and device fabrication using supramolecular dyad systems, quantum-dots-dye hybrid systems, cadmium chalcogenides thin films, for photovoltaic devices.
- Fabrication of carbon nanostructures composites, metal oxide-based hydrides and metal organic frameworks for supercapacitor devices, water-splitting, Li-ion battery studies, etc.
- Development of functional magnetic metal oxides and mixed metal oxide nanomaterials for magnetic hyperthermia application.
- Photocatalytic studies of doped/bare metal oxide nanoparticles or supported metal nanoparticles for chemical transformations include oxidation, reduction, condensation, degradation reactions.
- Nanocomposites between carbon nanotubes (CNTs) or graphene precursors with metal oxides nanoparticles as well as doped oxides for antibacterial formulations and bio-sensing studies.

Number of Ph.D. Students

i) Ph.D. degree awarded = 11+

ii) Ph.D. scholar working = 08+

Innovations and Entrepreneurship Development

- **Indian/German patents: 10+ (Granted:03+ and Filed:07+)**
- **Incubatee at SCIL & SUKRDf**, for the innovation of "Antimicrobial Paint Formulations".
- **Research Advisor at Fortunecoat Industries Pvt. Ltd.**, Kagal MIDC, Kolhapur 416 236 (MS), India.
- Recognized as **Innovation Ambassador under Central Government-Ministry of Education, Innovation Cell.**
- **Startup, "Nano Solutions Pvt Ltd."** (Reg.)
- **Consolation Prize** under Lokraja Startup & Innovation Competition-2022 for "Antimicrobial Paint".
- **Collaborations** with premier institutes in the countries like USA, UK, Taiwan, South Korea, etc.

Patents Granted/Filled

Sr. No.	Title of the IP (patent, design, trademark/copyright/GI)	Name of the inventor/inventors	Date of application	IPR application No. (IPO, Mumbai-India)
1.	Nanocomposites based antibacterial additives in paint formulations and process for preparation thereof (Granted)	Sagar D. Delekar & Shamkumar P. Deshmukh	24/12/2018	201821048854 (Indian)
2.	A method for evaluation of serotonin (5-HT) using NCs based electrodes (Granted)	Sagar D. Delekar & Sajid B. Mullani	24/12/2018	201821048909 (Indian)
3.	Binder free thin film deposition of composites and it's electrostatic connectivity with sensitizers for photovoltaic studies	Sagar D. Delekar, Ananta G. Dhodamani & Krantiveer V. More	25/12/2018	201821049028 (Indian)
4.	Process for catalytic reclamation of silver present in photoprocessing waste (Granted)	Sagar D. Delekar & Vrushali Shevale	23/01/2019	201921002716 (Indian)
5.	Square-facets nanobars MOF-derived Co ₃ O ₄ @Co/N-CNT core-shell based nanocomposites for highly efficient supercapacitor performance	Sagar D. Delekar & Swapnajit V. Mulik	24/03/2022	202221016775 (Indian)
6.	A process for fabricating metal organic frameworks-sensitized nanostructured metal oxide-based hybrids for photoelectrochemical water splitting	Sagar D. Delekar & Pramod A. Koyale	23/03/2023	202321020219 (Indian)
7.	Microbicidal functional nanocomposites for conformal leather coatings	Sagar D. Delekar & Vijay S. Ghodake	24/12/2022	202221073852 (Indian)
8.	A system for developing NiCo ₂ O ₄ /porous carbon (PC)/nickel foam (NF) as cathode for supercapacitor devices	Sagar D. Delekar & Swapnajit V. Mulik	11/01/2024	202024100119.2. (German)
9.	Metal-organic frameworks-derived CeO ₂ Nanobars modified g-C ₃ N ₄ -based nanocomposites for photoelectrochemical water splitting	Sagar D. Delekar & Pramod A. Koyale	01/02/2024	(German) --
10.	A formulation of chitosan mediated lithium ferrite nanomaterials for magnetic hyperthermia study	Sagar D. Delekar & Amol B. Pandhare	06/02/2024	(German) --

Research Projects Ongoing / Completed

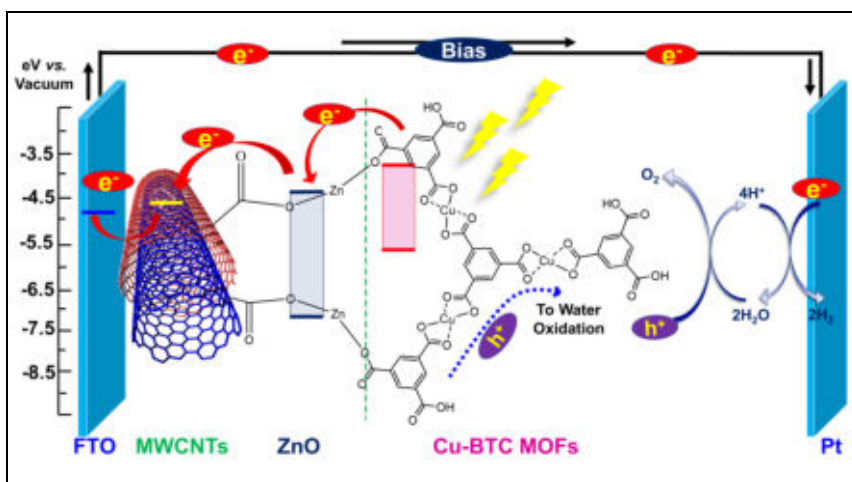
Sr. No	Title of Project / Scheme	Funding Agency	Amount Rs. (Lac)	Period
1.	Designing of Metal Oxide Nanocomposites as an Antibacterial Additives and their use in Paints Formulations (with industry)	RGSTC, Mumbai	05.00	2019 to 2021
2.	Design and Photovoltaic Studies of Multi-junction Inorganic-Organic Hybrid Solar Devices for Energy Harvesting	SU, Kolhapur	02.75	2018 to 2020
3.	Sensitization of Nanoporous Oxide/Carbon Nanohybrids by Quantum Dots for Solar Energy Harvesting	UGC, New Delhi	22.87	2015 to 2016
4.	Heterojunction Nanocomposites of Functionalized Carbon Nanostructures with Doped, Undoped TiO ₂ Nanoparticles for Solar Energy Harvesting	DST, New Delhi	21.82	2012 to 2015
5.	Synthesis, characterization of nanocrystalline metal doped titanium dioxide nanoparticles in photochemical transformations	UGC, New Delhi	06.28	2011 to 2014
6.	Synthesis and testing..... nonadrides.	UGC, New Delhi	07.72	2011 to 2014
7.	Well-designed Nanosized Zirconia-Based Solid Acid Catalysts, Their Characterization and Applications for Organic Synthesis and Transformation Reactions	UGC, New Delhi	03.11	2011 to 2014
8.	Solution Deposition of Cd _{1-x} Pb _x Se Thin Film for Photoelectrochem. Solar Cell Applications	UGC, New Delhi	00.95	2007 to 2009
9.	Physico-chemical Investigations of Drinking Water in Tuljapur City, Osmanabad District of Maharashtra	BAMU, Aurangabad	00.20	2006 to 2008

Book Editing/Publications

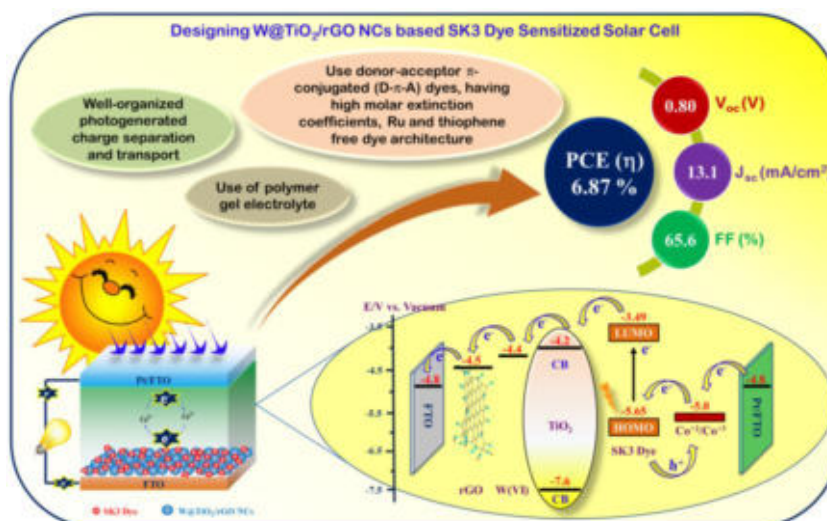
1. **Delekar, S.D.** Editor for a book, *“Advances in Metal Oxides and their Composites for Emerging Applications”*, by Series Editor: Prof. Ghenadii Korotcenkov under Metal Oxides Series, *Elsevier Publications* 2022 (ISBN: 978-0-323-85705-5).
2. Acquah, S.F.A., **Delekar, S. D.**, A. Al-HaririL., Nanotechnology and Nanomaterials, *“Carbon nanotubes - Current Progress of their Polymer Composites”*, book edited by Mohamed Reda Berber and Inas Hazzaa Hafez, INTECH Open Access Publications 2016, Chap. 8: *Carbon nanotubes and graphene as additives in 3D printing* (ISBN 978-953-51-2470-2).
3. **Delekar, S.D.**; *et al.* Chapter in book entitled *“Photocatalytic materials & surfaces for environmental cleanup III”*, Edited by Tayade, R.J. *Material Science Forum* 2013, 76, 293–306, Trans Tech Publications, Switzerland, 2013 (ISSN: 0255-5476).
4. **Delekar, S.D.** *Solid Solutions of Cadmium Chalcogenide Thin Films*, Lamberts Academic Publishing, 2012 (ISBN: 978-3-659-23065-3).

Research Publications

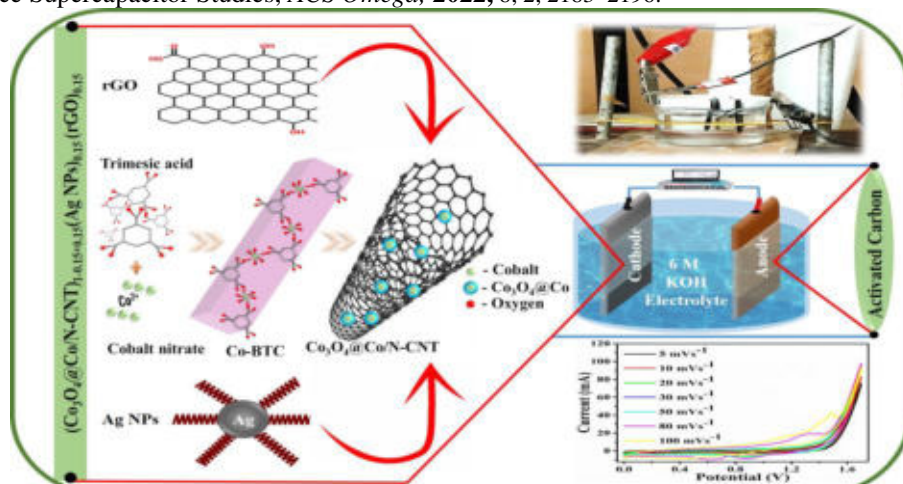
1. Koyale, P.A., Kulkarni, S.P., Gunjagr, J.L., Dongale, T.D., Sutar, S.S., Soni, S.S., Kapdi, Y.G., Ragesh N., Mulik, S.V., **Delekar, S.D.** ZnO Nanorod/Multiwalled Carbon Nanotube Composites Sensitized with Cu-Based Metal Organic Frameworks as Photoanodes for Solar-Driven Water Splitting. *ACS Applied Nano Materials*, 2024. (<https://doi.org/10.1021/acsanm.3c04694>)



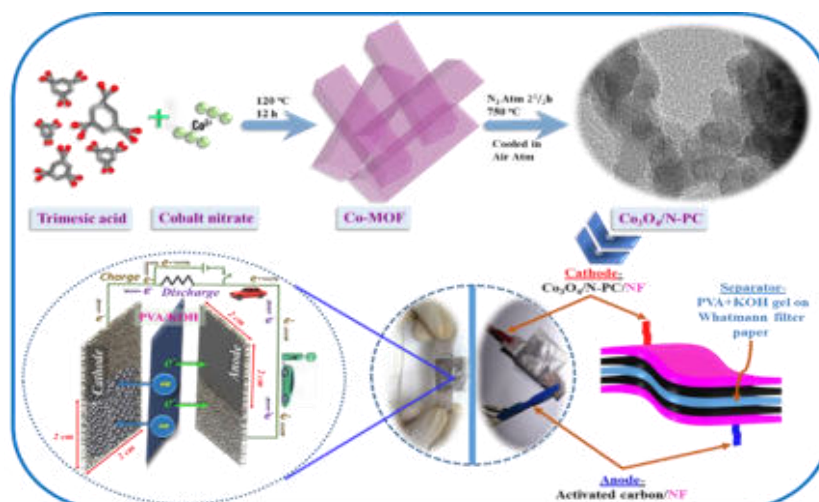
2. Pawar, P.S., Koyale, P.A., Ghodake, V.S., Mulik, S.V., Kapdi, Y.G., Soni, S.S., Mullani, N.B., **Delekar, S.D.**, Designing and Photovoltaic Studies of W@TiO₂/rGO Nanocomposites with Polymer Gel Electrolyte, *New Journal of Chemistry*, 2023, 47, 21825-21833.



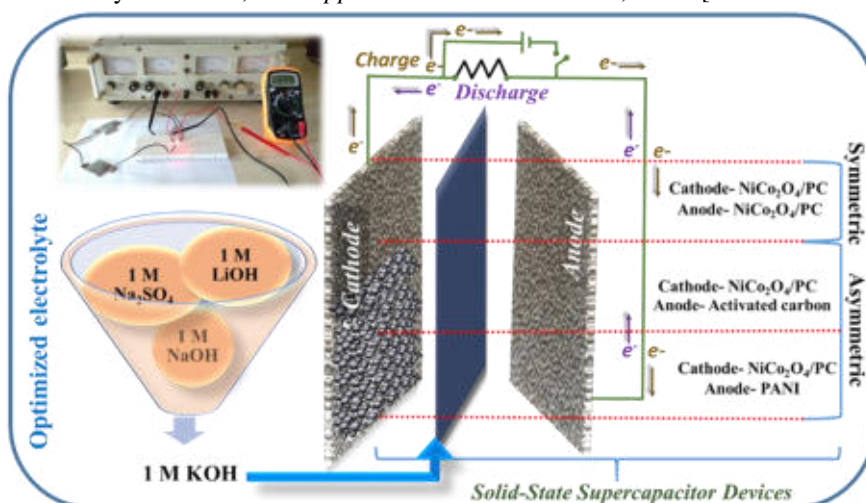
3. Mulik, S.V., Dhas, S.D, Moholkar, A.V, Panda, D.K., Parale, V.G, Park, H., Koyale, P.A., Ghodake, V.S., **Delekar, S.D.** Square-facets Nanobars MOF-derived Co_3O_4 @Co/N-doped CNT Core-Shell Based Nanocomposites as Cathode Materials for High Performance Supercapacitor Studies, *ACS Omega*, **2022**, 8, 2, 2183–2196.



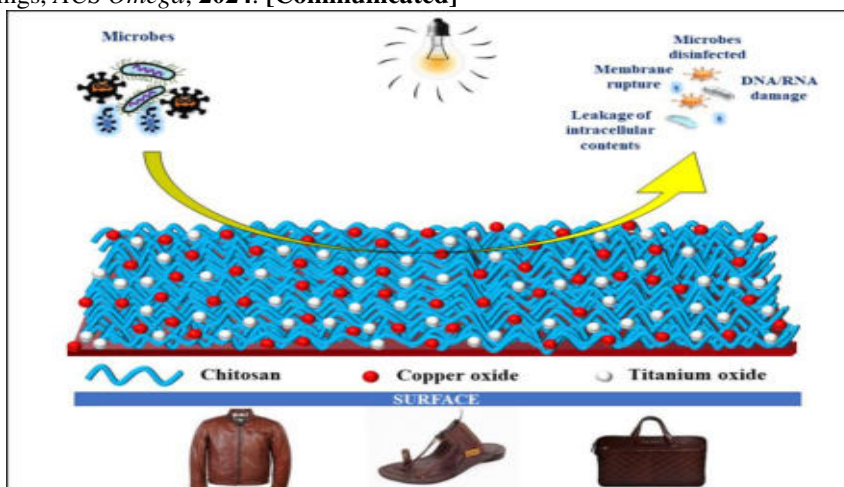
4. Garud, H.B., Jadhav, S.A., Jadhav, S.P., **Delekar, S.D.**, Patil, P.S. Surface Modified Silicon Dioxide based Functional Adsorbents Derived from Waste Sand for the Removal of Toxic Pollutants from Water, *Silicon*, **2023**. 15, 4569-4584.
5. Mulik, S.V., Phandhare, A.B., Dhas, S.D., Soni S.S., **Delekar, S.D.** High Performing Solid-State Asymmetric Supercapacitor Studies of Binder-Free Deposited Co_3O_4 /N-doped Porous Carbon as Cathode with Gel-Electrolyte, *Chemistry Select*, **2024**. [Accepted]



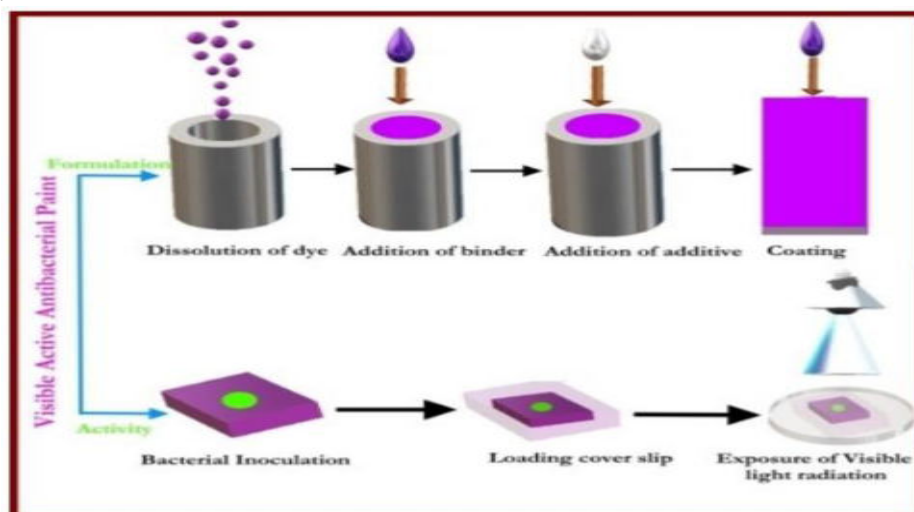
6. Mulik, S.V., Soni, S.S., Parale, V.G., Park, H., Mhaske, S.M., Tonagle, T.D., **Delekar, S.D.** Appraisal of Bimetallic MOF-derived NiCo_2O_4 /Porous Carbon/Nickel Foam for Symmetric and Asymmetric Supercapacitor Devices: Electrode Material Synthesis with Aqueous Electrolytes Studies, *ACS Applied Electronic Materials*, **2024**. [Communicated]



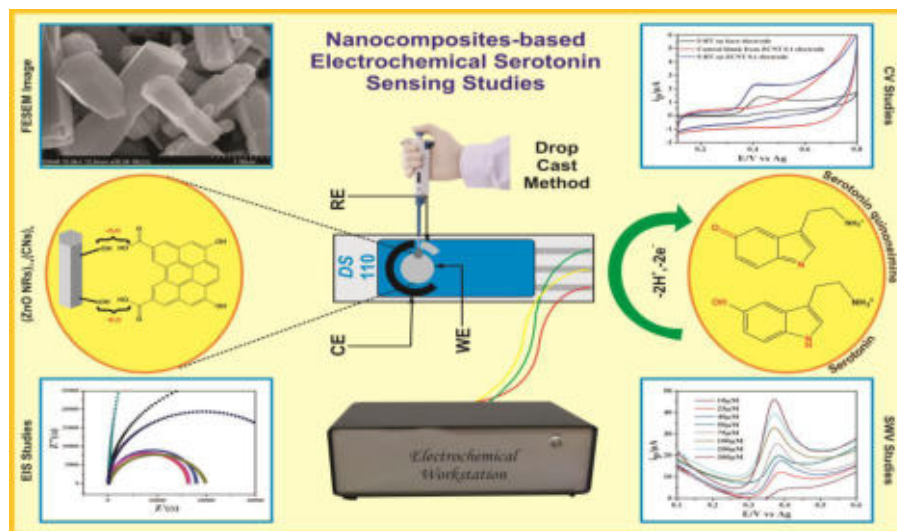
7. Koyale, P.A., **Delekar, S.D.** A review on practical aspects of CeO₂ and its composites for photoelectrochemical water splitting, *International Journal of Hydrogen Energy*, **2024**, 51, 515-530.
8. Koyale, P.A., Dongale, T.D., Sutar, S.S., Mullani, N.B., Gunjagr, J.L., **Delekar, S.D.** Boosting the Photoelectrochemical performance of ZnO nanorods with Co-doped Zn-ZIFs metal-organic frameworks for water splitting studies, *International Journal of Hydrogen Energy*, 2024. [Accepted]
9. Ghodake, V.S., More, V.B., Sonawane, K.D., **Delekar, S.D.** Functional TiO₂-CuO-Chitosan nanocomposites as microbicidal agents for leather coatings, *ACS Omega*, **2024**. [Communicated]



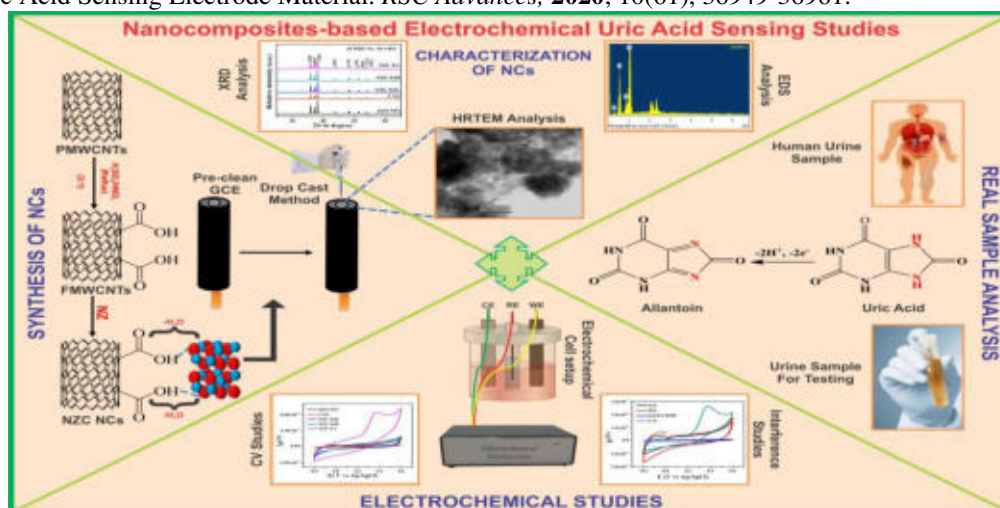
10. More, K.V., Dhodamani, A.G., Dongale, T.D., Panda, D.K., Delekar, S.D. Compositional-dependent enhanced physicochemical and photovoltaic studies of nanocrystalline Ti_{1-x}Fe_xO_{2-δ} photoelectrodes co-sensitized with CdS QDs-N719 dye, *Journal of Solid-State Electrochemistry*, **2022**, 26 (4), 1075-1084.
11. Patil, S.M., Vanalakar, S.A., Sankpal, S.A., Deshmukh, S.P. **Delekar, S.D.** Sulfated TiO₂/SnO₂ nanocomposite as a green heterogeneous catalyst for direct amide formation reaction, *Results in Chemistry*, **2021**, 3, 100102.
12. Deshmukh, S.P., Koli, V.B., Dhodamani, A.G., Patil, S.M., Ghodake, V.S., and **Delekar, S.D.** Ultrasonochemically Modified Ag@TiO₂ Nanocomposites as Potent Antibacterial Agent in the Paint Formulation for Surface Disinfection, *Chemistry Select* **2021**, 6, 113–122.



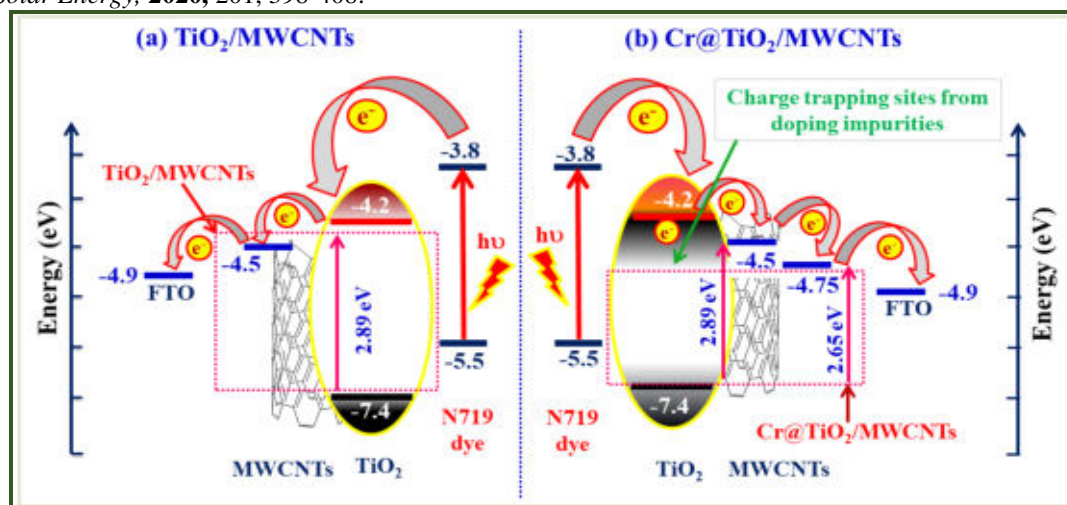
13. Kumbhar, D., Kumbhar, S., Dhodamani, A.G., **Delekar, S.D.**, Harale, N.S., Nalawade, R., Nalawade, A., Enhanced photoelectrochemical cell performance of Co doped ZnO Nanoparticles Sensitized By Affordable Mixed Dyes as Sensitizer, *Taylor & Francis Group*, **2020**.
14. Patil, R.P., Waghmare, M.B., Kalantre, V.M., Kadam, M.R., Chikalkar, M.G. and **Delekar, S.D.** Effect of Sintering Temperature on Structural, Morphological, and Magnetic Properties of Nickel Ferrite Prepared via a Polyol Method, *Macromol. Symp.* **2020**, 393, 2000178.
15. Mullani, S.B., Dhodamani, A.G., Shellikeri, A., Mullani, N.B., Tawade, A., Tayade, S.N., Biscay, J., Dennany, L., **Delekar, S.D.** Structural Refinement and Electrochemical Properties of One-dimensional (ZnO NRs)_{1-x}(CNs)_x Functional Hybrids for Serotonin Sensing Studies. *Scientific Reports*, **2020**, 10(1), 1-18.



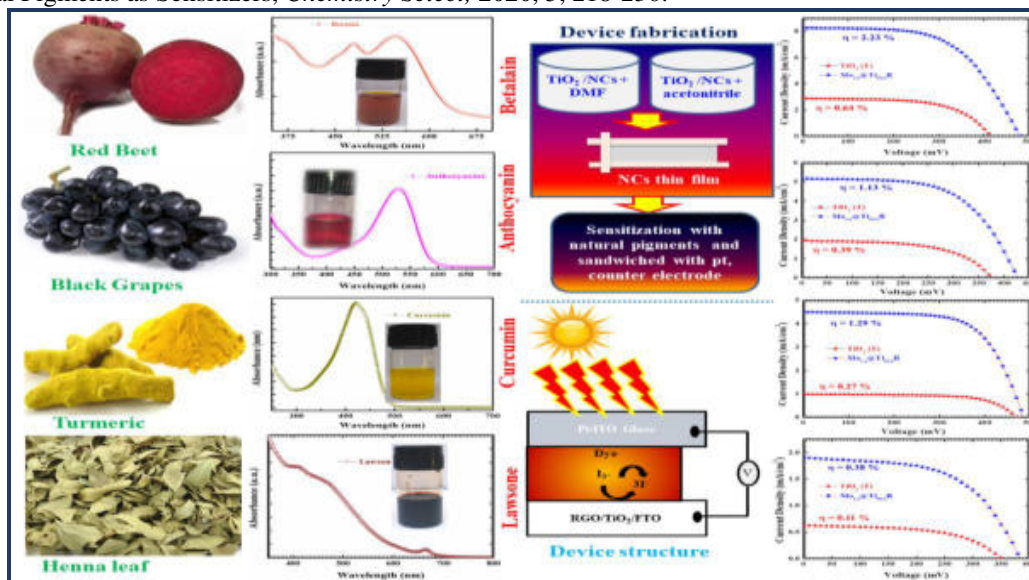
16. Jirage, S.B., Pagare, P.K., Garadkar, K.M., **Delekar, S.D.**, Bhushe, V.M. Novel chemical approach to synthesis and characterization of greener and rock-like $\text{Cu}_2\text{ZnSnS}_3\text{Se}$ (CZTSSe) thin films of kasterite structure, *Materials Today: Proceedings*, **2020**, 43, 2774-2779.
17. Mullani, S.B., Tawade, A.K., Tayade, S.N., Sharma, K.K., Deshmukh, S.P., Mali, S.S., Hong, C.K., Mullani, N.B., **Delekar, S.D.** Synthesis of Ni^{2+} ions Doped ZnO-MWCNTs Nanocomposites using in-situ Sol-Gel Method: An Ultra-Sensitive Non-enzymatic Uric Acid Sensing Electrode Material. *RSC Advances*, **2020**, 10(61), 36949-36961.



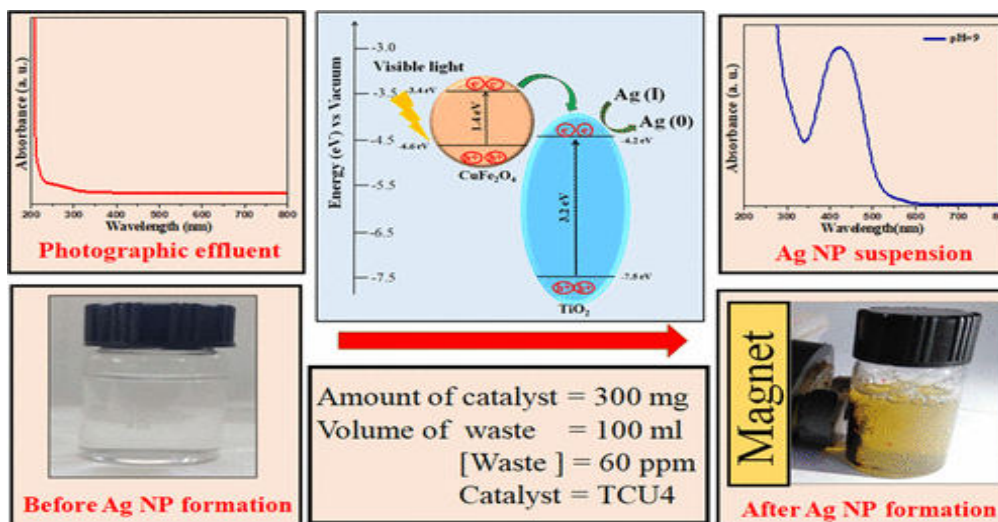
18. Dhodamani, A.G., More, K. V., Patil, S. M., Shelake, A. R., Shinde, S. K., Kim, Dae-Young, **Delekar, S. D.** Synergistics of Cr(III) Doping in $\text{TiO}_2/\text{MWCNTs}$ Nanocomposites: Their Enhanced Physicochemical Properties in relation to Photovoltaic Studies. *Solar Energy*, **2020**, 201, 398-408.



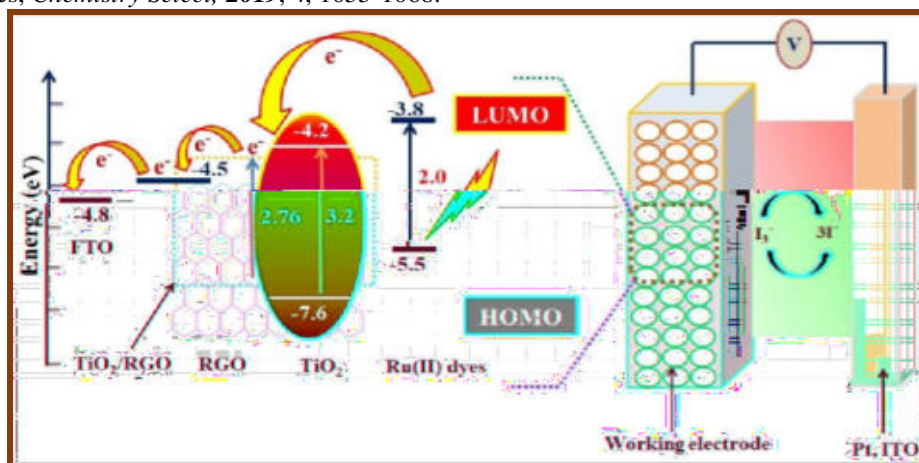
19. Dhodamani, A.G., More, K.V., Mullani, S.B., Deshmukh, S.P., Koli, V.B., Panda, D.K., **Delekar, S.D.** Structural Refinement and Optoelectronic Properties of $(\text{Mo}_x\text{Ti}_{1-2x}\text{O}_{2-\delta})_{1-y}(\text{RGO})_y$ Nanocomposites and Their Photovoltaic Studies with Natural Pigments as Sensitizers, *Chemistry Select*, **2020**, 5, 218-230.



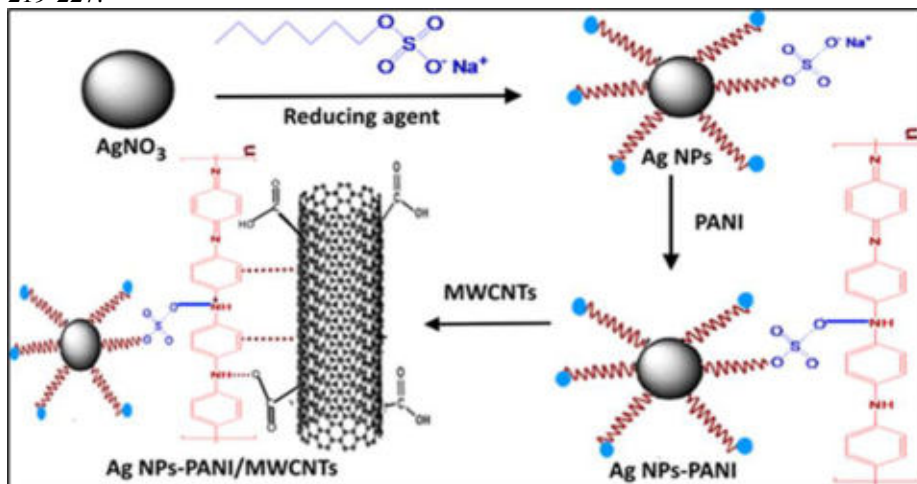
20. Shevale, V.B., Dhodamani, A.G., **Delekar, S.D.** Catalytic Reclamation of Silver Present in Photographic Waste using Magnetically Separable $\text{TiO}_2@\text{CuFe}_2\text{O}_4$ Nanocomposites and thereof its use in Antibacterial Activity, *ACS Omega*, **2020**, 5, 1098-1108.



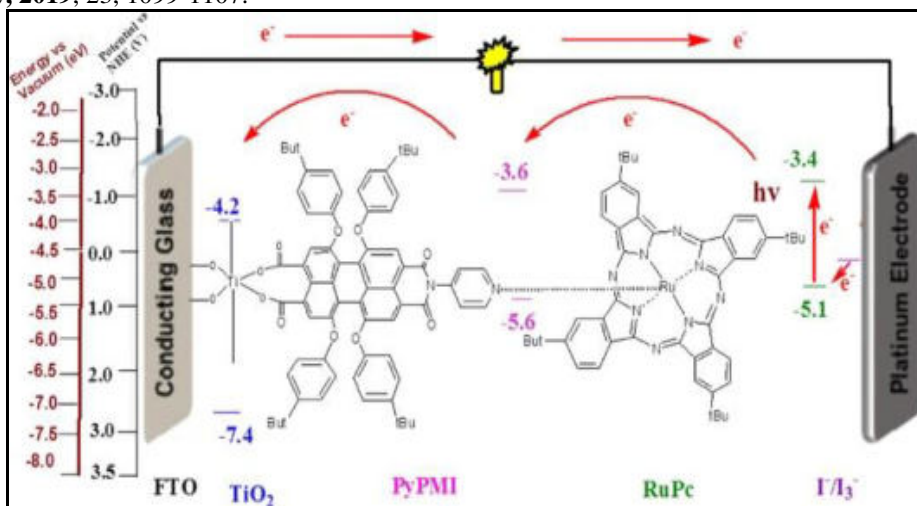
21. Dhodamani, A.G., More, K.V., Koli, V.B., Shelke, A.R., Deshpande, N.G., Panda, D.K., **Delekar, S.D.** Compositional Dependent Physicochemical and Photovoltaic Properties of the $(\text{TiO}_2)_{1-x}(\text{RGO})_x$ Nanocomposites for Sensitized Solar Cells using Ru(II) Dyes, *Chemistry Select*, **2019**, 4, 1055-1068.



22. Sutar, R.S., Barkul, R.P., **Delekar, S.D.**, Patil, M.K. Sunlight Assisted Photocatalytic Degradation of Organic Pollutants using g-C₃N₄-TiO₂ Nanocomposites, *Journal Arabian Journal of Chemistry*, **2020**, 13, 4966-4977.
23. Deshmukh, S.P., Patil, S.M., Mullani, S.B., **Delekar, S.D.** Silver Nanoparticles as an Effective Disinfectant: A Review. *Materials Science and Engineering C*, **2019**, 97, 954-965 (**Most downloaded article**).
24. Patil, S.M.; Deshmukh, S.P., More, K.V., Shewale, S.B., Mullani, S.B., Dhodamani, A.G., **Delekar, S.D.** Sulfated TiO₂/WO₃ Nanocomposite: An Efficient Photocatalyst for Degradation of Congo Red and Methyl Red Dyes under Visible Light Irradiation, *Materials Chemistry and Physics*, **2019**, 225, 247-255.
25. Deshmukh, S.P., Dhodamani, A.G., Patil, S.M., Mullani, S.B., More, K.V., **Delekar, S.D.** Interfacially Interactive Ternary Silver-supported Polyaniline/multiwalled Carbon Nanotube Nanocomposites for Catalytic and Antibacterial Activity, *ACS Omega*, **2019**, 5, 219-227.

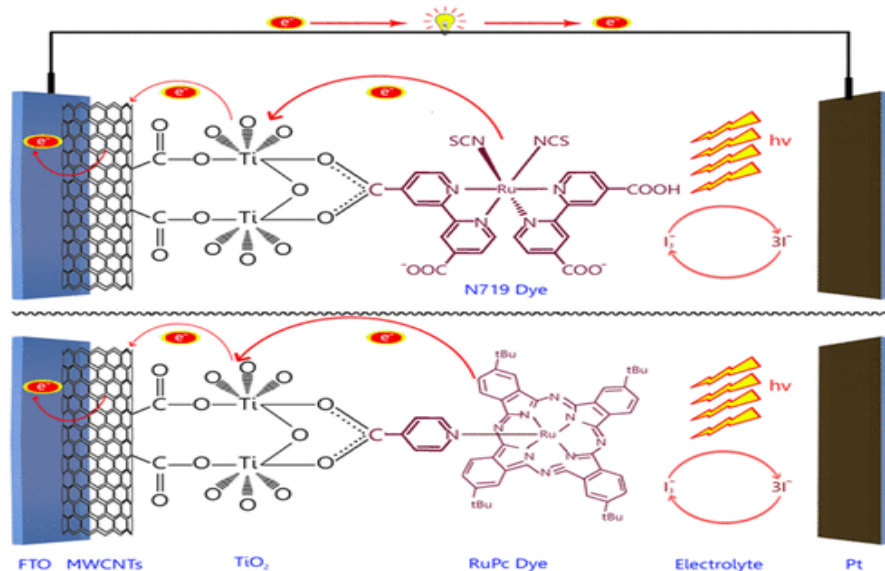


26. **Delekar, S.D.**, More, K.V., Dhodamani, A.G., Maity, K., Acquah, S.F.A., Dalal, N.S., Panda, D.K. Noncovalent Interactions based Self-assembled Bichromophoric Sensitizer for Dye-sensitized Solar Cells. *Journal of Solid-State Electrochemistry*, **2019**, 23, 1099-1107.



27. Deshmukh, S.P., Mullani, S.B., Koli, V.B., Patil, S.M.; Kasabe, P.J., Dandge, P.B., Pawar, S.A., **Delekar, S.D.** Ag Nanoparticles Connected to the Surface of TiO₂ Electrostatically for Antibacterial Photoinactivation Studies, *Photochemistry and Photobiology*, **2018**, 94, 1249-1262.
28. Patil, S.M.; Vanalakar, S.A., Dhodamani, A. G., Deshmukh, S.P., Patil, V.L., Patil, P.S., **Delekar, S.D.** NH₃ Gas Sensing Performance of Ternary TiO₂/SnO₂/WO₃ Hybrid Nanostructures Prepared by Ultrasonic-Assisted Sol-gel Method, *Journal of Materials Science: Materials in Electronics*, **2018**, 29, 11830-11839.
29. **Delekar, S. D.**, More, K. V., Dhodamani, A. G., Patil, S.M., Dongale, T.D., Maity, K., Dalal, N., Panda, D.K. Molecular Self-assembled Designing and Characterization of TiO₂ NPs-CdS QDs-dye Composite for Photoanode Materials, *Materials Characterization*, **2018**, 139, 337-346.
30. Patil, S.M.; Dhodamani, A. G., Vanalakar, S.A., Deshmukh, S.P., **Delekar, S. D.** Multi-applicative Tetragonal TiO₂/SnO₂ Nanocomposites for Photocatalysis and Gas Sensing, *Journal of Physics and Chemistry of Solids*, **2018**, 115, 127-136.

31. **Delekar, S. D.**, Dhodamani, A. G., More, K. V., Dongale, T. D., Kamat, R. K., Acquah, S. F. A., Panda, D. K. Structural, Optical Properties of Nanocrystalline TiO₂ with MWCNTs and its Photovoltaic Studies using Ru(II)-Sensitizers, *ACS Omega*, **2018**, 3, 2743-2756.



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Research Skills

1. Synthesis of semiconducting or metal nanoparticles like TiO₂, ZnO, Co₃O₄, CdS quantum dots, CdSe quantum dots, Silver/Copper Nanoparticles and their nanocomposites and their designing in the different biosensing devices as well as energy storage and conversion devices such as solar cells, supercapacitors, battery, etc.
2. Deposition of TiO₂, ZnO, Co₃O₄, etc. films by doctor blading, spin coating, spray pyrolysis and screen-printing method.
3. Electrochemistry, Cyclovoltammetry (CV) growth, potentiostats-growth, constant -current growth, differential pulse voltammogram (DPV) for determination of the redox properties of materials (Calculation of HOMO, LUMO and band gap energy of various monomers/ oligomers, different dyes). Spectroelectrochemistry.
4. Diffuse-Reflectance UV-Visible Spectrophotometry for band-gap evaluation of materials.
5. Determination of the quantity of dye loading on various semiconductor surfaces by UV-Vis Spectroscopy.
6. Fabrication and characterization of Multichromophoric dye-sensitized solar cells based on supramolecular dyads. Characterization of various supramolecular dyad/triad based dye sensitized solar cells,
7. Designing and characterization of hybrid devices using Quantum Dots and various dyes as an chromospheres molecule.
8. Fabrication and characterization of hybrid organic-inorganic materials for solar-to-electrical Energy Conversion.
9. Well expertise with interpretation of structural (XRD, Raman), Morphological (HRTEM, FESEM, etc) and Compositional/functional tools (FTIR, XPS, EDAX).
10. Handling of Solar Simulator for I-V and IPCE measurements.

Research Capabilities

1. Fabrication and Characterization of Photovoltaic Cells

Fabrication and Characterization various solar cells such as Solid-State Dye-Sensitized Solar Cells (DSSCs), Liquid-DSSCs, Supramolecular Self-assembled Multichromophoric solar cells, Dye-QDs Solar Cells, Thin-Film based Inorganic-Organic hybrid Perovskite solar cells. Measurement of Current-Voltage (I-V) curve of these photovoltaic devices by a solar simulator. IPCE (Incident Photon to Current Efficiency) measurement for sensitization effect of the materials within solar cells. Conductivity measurement by four-probe technique.

2. Fabrication and Characterization of Supercapacitor Devices

Fabrication and characterization of various solid/liquid state asymmetric supercapacitors devices using MOFs derived porous metal oxides as active cathode materials. Electrochemical behavior (CV, GCD, EIS, Cycle stability, etc.) measurements using potentiostat.

3. Electrochemical tools

Electrochemistry and Spectroelectrochemistry, Photo-electrochemistry, Cyclic voltammetry (CV for calculation of redox properties of materials), Chronoamperometry and potentiostats growth, differential pulse voltammogram (DPV), electrochemical polymerization and photo-electrochemical polymerization, Electrochemical Impedance spectroscopy (EIS).

4. Spectroscopy, Electron microscopic and Diffraction tools

UV-Vis-NIR & Diffuse Reflectance Spectroscopy, Fluorescence spectroscopy (steady state), Time –correlated single-photon-counting (TCSPC), time–resolved fluorescence spectroscopy, FT-IR and Raman spectroscopy, XRD, X-ray Photoelectron Spectroscopy (XPS), Electron Paramagnetic Resonance (EPR) techniques and NMR, HRTEM-TEM, FESEM-EDS, etc.

5. Other Techniques

Thermogravimetric Analysis (TGA), Thin liquid chromatography (TLC), Thickness measurement by surface-profilometer, Various coating such as chemical vapor deposition, metal evaporation, spin coating and spray pyrolysis, BET, etc.

Other Professional Activities

- **Editor**, Journal of Shivaji University: Science & Technology, by Shivaji University, Kolhapur (January 2022 onwards).
- **Co-ordinator**, Global Initiatives for Academic Network (GIAN) Workshop, organized by Department of Chemistry, Shivaji University, Kolhapur (India) [16th October 2023 - 20th October 2023].
- **Co-ordinator**, UGC-Stride Online Lecture Series, organized by Department of Chemistry, Shivaji University, Kolhapur (India) [27th January - 1st February, 2021].
- **Secretary**, International Conference on Advances in Chemical Sciences (IC-ACS 2018), organized by Department of Chemistry, Shivaji University, Kolhapur (India) [1st - 3rd February, 2018].
- **Secretary**, National symposium on Current Trends in Chemical and Nanosciences (CTCNS-2014), organized by Department of Chemistry, Shivaji University, Kolhapur (India) [17th - 18th January 2014].
- **Secretary**, National Conference on Sustainable Chemistry: Challenges and Opportunities (NC-SCCO 2012), organized by Dept of Chemistry, Dr. Babasaheb Ambedkar Marathwada Univer., Sub-campus Osmanabad, India, [9th - 10th Jan., 2012].

Membership in Academic/Professional Associations

- **Fellow of Maharashtra Academy of Sciences**, Maharashtra, India [Dec. 2021].
- **Member of Research Recognition Committee**, MGM University, Aurangabad (MS) India [Dec. 2020 onwards].
- **Member of American Chemical Society**, USA (Member Number: 30135318) [2021-2022].
- **Member of Senate and Standing Committee**, Shivaji University, Kolhapur (MS) India [2017-2022].
- **Member of Academic Council**, Vivekanand College (Auto.), Kolhapur (MS) India [2018-2023].
- **Member of BoS-Chem**, Yashavantrao Chavan Institute of Science (Auto.), Satara (MS) India [2018 onwards].
- **Annual Member of International Solar Energy Society**, Germany [2017-2018].

Professional Honors, Awards and Fellowships

1. **Indian Scientists Rank (at 128 among top 500)** in Photocatalysis & Solar Cells recognized by **Elsevier SciVal** (2021).
2. Reckoned in **World Scientists Ranking (Institute rank-12, Country rank-2780)** by **AD Scientific Index Ltd.** (2023).
3. Awarded as a “**Raman Post-Doctoral Fellowship**”, by University Grants Commission, New Delhi (India) for conducting the research at Department of Chemistry & Biochemistry, Florida State University, USA (2015-2016).
4. Awarded a certificate in recognition of contribution in “**Global Ambassador Program**” at Florida State Uni., USA(2015).
5. Recipient of “**Fast Track Research Proposal for Young Scientists**”, by Depart. of Science & Technology, New Delhi (India) for the financial assistance to conduct the research project at Shivaji University, Kolhapur (2013-2016).
6. Awarded as a “**Visiting Scientist/Teacher Faculty**”, by Indian Academy of Sciences, Bangalore for conducting summer research fellowship at Inorganic & Physical Chemistry Div., Institute of Science, Bangalore (2010).
7. Worked as a “**Founder Head of the Department**”, Department of Chemistry, Dr. Babasaheb Ambedkar Marathwada University, Sub-campus Osmanabad, (MS) India (2005-2011).

Community Services

- Public/invited talks in colleges/universities/schools in different activities to boost the science, technology and innovations.
- Consultancy services in soil/water analysis, thermal & morphological analysis of foundry or ceramic samples.
- Volunteer in Tree Plantation, Flood Camp & Covid-19 Quarantine Center at Shivaji University, Kolhapur (India).

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