



Major Areas of Research/Up to 3 major sponsored projects

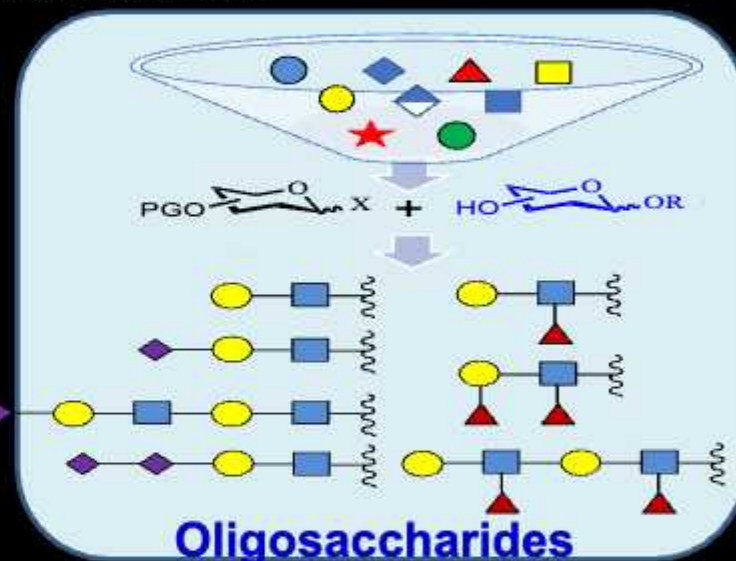
- 1) Development of synthetic strategy for carbohydrate based bioactive molecules
- 2) Development of Glyco-tools for potential drug delivery to the tumor cell
- 3) Electrochemical glycosylation: A green approach to access oligosaccharides

Major Research Facilities in the Group

- 1) 0°C to -80°C Low constant reaction bath with stirrer
- 2) Electrochemical Flow Reactor (will procure)
- 3) Automated flash column chromatography (will procure)

Technology/Product Developed/Up to 3 most significant Publications

- 1) A. Sau, R. Williams, C. Palo-Nieto, A. Franconetti, S. Medina, M. C. Galan. "Palladium-Catalysed Direct Stereoselective Synthesis of Deoxyglycosides from Glycals" *Angew. Chem. Int. Ed.*, **2017**, *56*, 3640-3644.
- 2) C. Palo-Nieto, A. Sau, M. C. Galan. "Gold (I) Catalysed Stereoselective Synthesis of Deoxyglycosides" *J. Am. Chem. Soc.* **2017**, *139*, 14041-14044.
- 3) A. Sau, K. Nagrajan, B. Patrahau, L. Lethuillier-Karl, R. Vergauwe, A. Thomas, J. Moran, C. Genet, T. W. Ebbesen "Modifying Woodward-Hoffmann Stereoselectivity under Vibrational Strong Coupling": *Angew. Chem. Int. Ed.*, **2021**, *60*, 5712-5717.



Arup Mahata

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Major Areas of Research/Up to 3 major sponsored projects

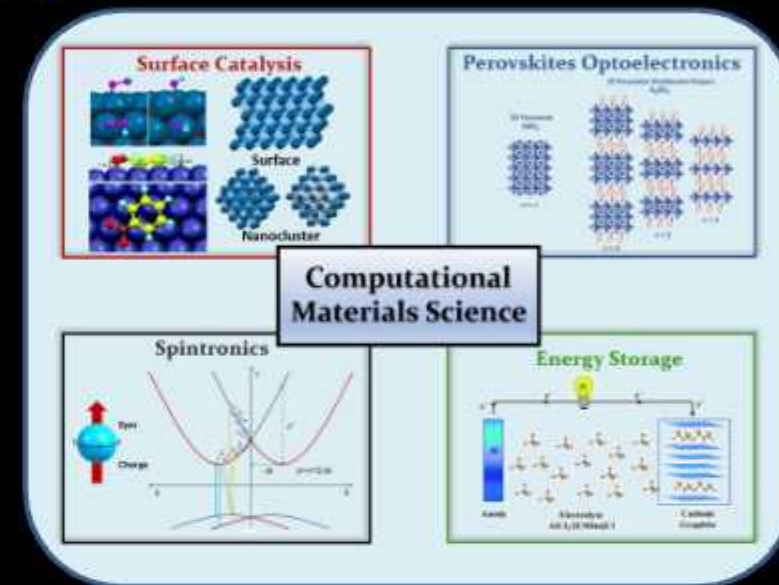
Computational Materials Science, First-Principles Calculations, Density Functional Theory, Perovskites Optoelectronics, Energy Storage Materials, Surface Catalysis (Electrochemical, Photoelectrochemical, Thermochemical), Molecular Catalysis, Spintronics

Major Research Facilities in the Group

Computational Chemistry Open Source DFT Software packages (Quantum Espresso, CP2K, ORCA, NWChem)

Technology/Product Developed/Up to 3 most significant Publications

1. A. H. Proppe, A. Johnston, S. Teale, **Arup Mahata**, R. Quintero-Bermudez, E. H. Jung, L. Grater, T. Cui, T. Filleter, C. Y. Kim, S. O. Kelley, F. De Angelis, E. H. Sargent, Multication perovskite 2D/3D interfaces form via progressive dimensional reduction, **Nat. Commun.** 2021, 12, 3472
2. **Arup Mahata**,* E. Mosconi, D. Meggiolaro, F. De Angelis, Modulating band alignment in mixed dimensionality 3D/2D perovskites by surface termination ligand engineering, **Chem. Mater.** 2020, 32, 105–113.
3. Y. Yang, C. Liu, **Arup Mahata**, M. Li, C. Roldan-Carmona, Y. Ding, Z. Arain, W. Xu, Y. Yang, P. A. Schouwink, A. Zuttel, F. De Angelis, S. Dai, M. K. Nazeeruddin, Universal approach toward high-efficiency two-dimensional perovskite solar cells via a vertical-rotation process, **Energy Environ. Sci.** 2020, 13, 3093–3101.



Ashutosh Kumar Mishra



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Major Areas of Research/Up to 3 major sponsored projects

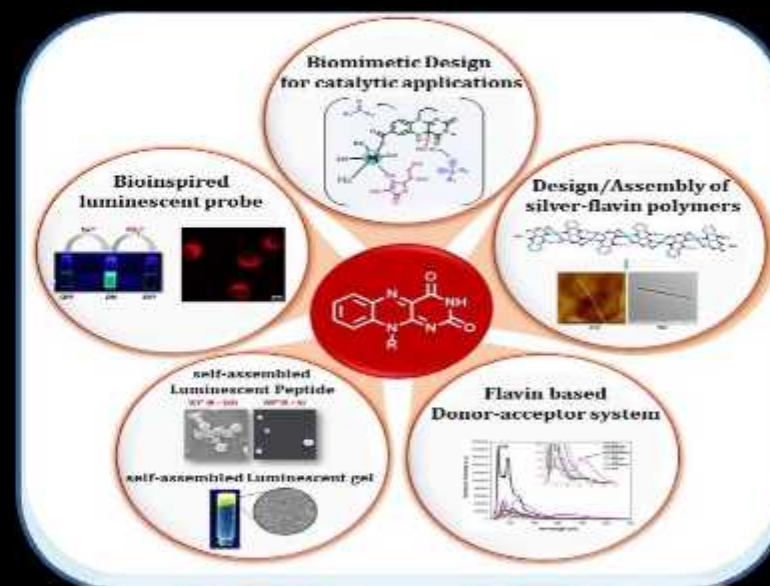
- ❖ Biomimetic synthetic design for catalytic transformations
- ❖ Bioinspired luminescent probe for bioimaging and sensing applications
- ❖ Design and functionalization of Metal-organic framework

Major Research Facilities in the Group

- ❖ Optical Microscope
- ❖ Fluorimeter
- ❖ High performance liquid chromatography (HPLC)

Technology/Product Developed/Up to 3 most significant Publications

- ❖ Design and synthesis of Flavin-Samarium complex as efficient photocatalyst for sulfoxidation reactions, Mouli, Katyal and Mishra Synlett, 2022, DOI: 10.1055/a-1928-3417
- ❖ Formation of the silver-flavin coordination polymers and their morphological studies. Mouli and Mishra, CrystEngComm, 2022, 24, 2221-2225
- ❖ Modulating catalytic activity of a modified flavin analogue via judiciously positioned metal ion toward aerobic sulfoxidation. Mouli and Mishra, RSC Adv., 2022, 12, 3990



Debasish Koner



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Major Areas of Research

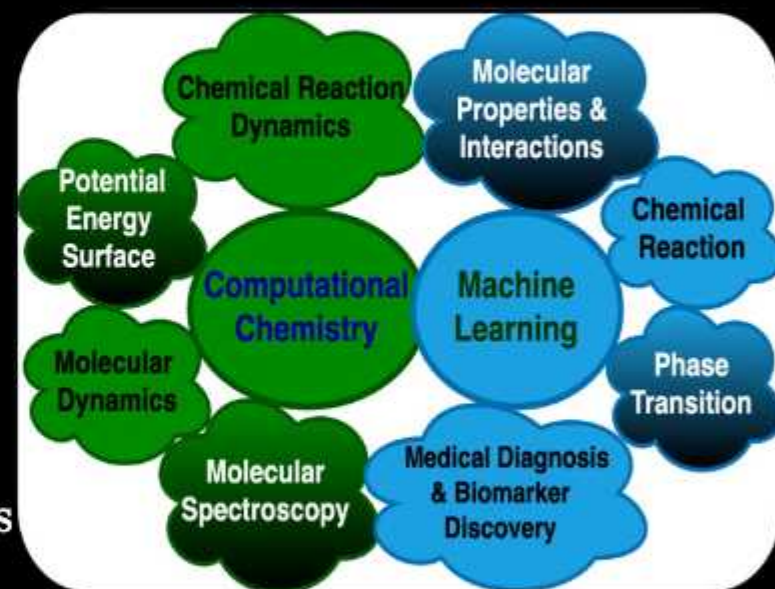
- Machine Learning in Chemistry
- Chemical Reaction Dynamics
- Molecular Spectroscopy
- AI Driven Medical Diagnosis and Biomarker Discovery
- Atmospheric and Astro-chemistry

Major Research Facilities in the Group

- Institute High Performance Computing (HPC)
- Computational Chemistry softwares
- AI and ML softwares

Up to 3 most significant Publications

- Koner, D. Quantum and quasiclassical dynamical simulations for the Ar_2H^+ on a new global analytical potential energy surface *J. Chem. Phys.* 154, 054303 (2021)
- Koner, D.; Meuwly, M. Permutationally Invariant, Reproducing Kernel-Based Potential Energy Surfaces for Polyatomic Molecules: From Formaldehyde to Acetone *J. Chem. Theory Comput.* 16, 5474-5484 (2020)
- Koner, D.; Unke, O. T.; Boe, K.; Bemish, R. J.; Meuwly, M. Exhaustive state-to-state cross sections for reactive molecular collisions from importance sampling simulation and a neural network representation. *J. Chem. Phys.* 150, 211101 (2019)





Melepurath Deepa

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Major Areas of Research: Applied Electrochemistry: Solution Processed Solar Cells, Batteries, Supercapacitors, Electrochromic Devices, Photoelectrochromic Devices, Photo-supercapacitors

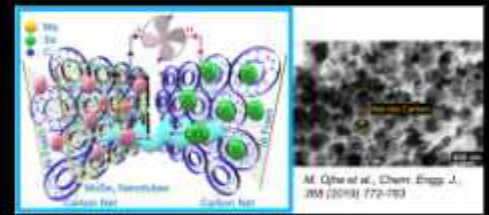
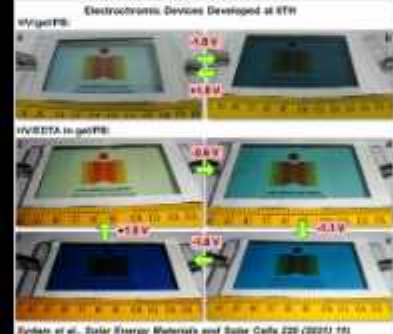
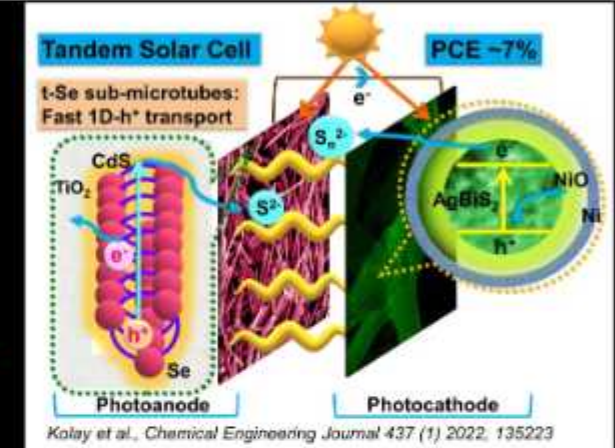
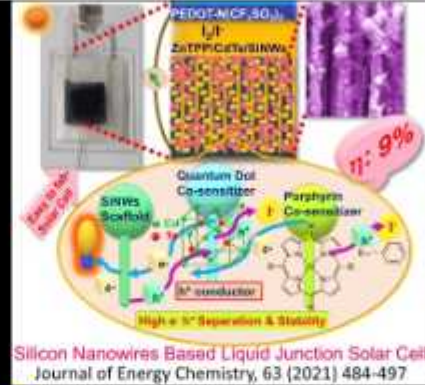
Major Research Facilities in the Group: Class

AAA Solar Simulator, IPCE Measurement facility, UV-Vis, Fluorescence spectrometers, Battery Testers, Electrochemical Workstations, Freeze Dryer, Microwave Reactor, Glove Boxes, Pouch cell supercapacitor fabrication facility, Furnaces, Ovens, Stirrers, Rotary Evaporator, Chiller etc

Technology/Product Developed:

- Developed pouch cell supercapacitor [at TRL: 4-5].
- Developed and demonstrated a prototype electrochromic device (~8 cm x 5 cm) with switching between blue and transparent states [at TRL-6].

Developed quasi-solid state low cost quantum dot solar cell with an efficiency of ~10%.



Faiz Ahmed Khan

Organic Synthesis Lab, Department of Chemistry

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Major Areas of Research

- * Discovery of new methodologies and their evaluation for biological application.
- * Synthesis of natural and aesthetically pleasing unnatural products.
- * Chemical synthesis in ionic liquids and supported catalysts.

Selected Publications

Direct α -Benzylation of Methyl Enol Ethers with Activated Benzyl Alcohols: Its Rearrangement and Access to (\pm)-Tetrahydronyasol, Propterol A, and 1,3-Diarylpropane *J. Org. Chem.* **2019**, 84, 21, 14270–14280. (DOI: [10.1021/acs.joc.9b02064](https://doi.org/10.1021/acs.joc.9b02064))

Synthesis and antibacterial activities of marine natural product ianthelliformisamines and subereamine synthetic analogues *Bioorg. Med. Chem. Lett.* **39**, **2021**, 127883. DOI: [10.1016/j.bmcl.2021.127883](https://doi.org/10.1016/j.bmcl.2021.127883)

Solvent controlled synthesis of 2,3-diarylepoxo indenones and α -hydroxy diarylindanones and their evaluation as inhibitors of DNA alkylation repair *Org. Biomol. Chem.*, **2022**, 20, 5820–5835. DOI: [10.1039/D2OB00595F](https://doi.org/10.1039/D2OB00595F)

Boron Trifluoride Etherate-Controlled Reactions of Methyl Enol Ethers: Selective Synthesis of Dihydrofuro[3,2-c]chromenone and Furo[3,2-c]chromenone Derivatives *Synlett* **2022**, 33. DOI: [10.1055/a-1912-3884](https://doi.org/10.1055/a-1912-3884)

Major Research Facilities in the Group



IKA-ElectraSyn 2.0

Flash Chromatography Multivial Reactor



Jai Prakash

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Major Areas of Research

1. Metal chalcogenides
2. Thermoelectric materials
3. Superconducting materials
4. Small molecule crystallography

Major Research Facilities in the Group

1. Glove box
2. Programmable furnaces
3. Vacuum sealing line
4. Hydrothermal autoclaves

Publications

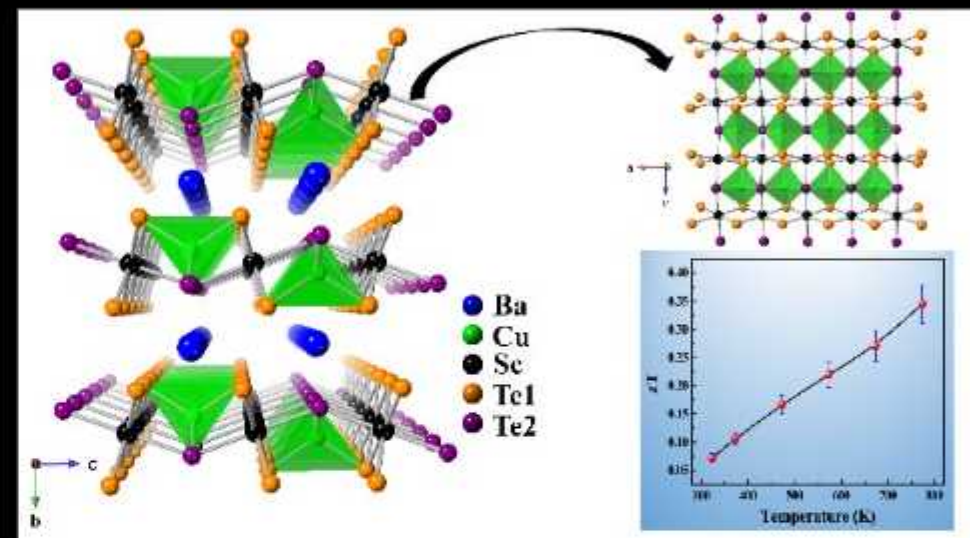
1. Subhendu Jana, Gopabandhu Panigrahi, Mohd Ishtiyak, S. Narayanswamy, Pinaki P. Bhattacharjee, Manish K. Niranjana, and **Jai Prakash**,

Germanium Antimony Bonding in $\text{Ba}_4\text{Ge}_2\text{Sb}_2\text{Te}_{10}$ with Low Thermal Conductivity, *Inorg. Chem.*, 61 (2022) 968.

2. Sweta Yadav, Subhendu Jana, Gopabandhu Panigrahi, Sairam K. Malladi, Manish K. Niranjana, and **Jai Prakash**, Five coordinated Mn in

$\text{Ba}_4\text{Mn}_2\text{Si}_2\text{Te}_9$: synthesis, crystal structure, physical properties, and electronic structure, *Dalton Trans.*, 51 (2022) 9265.

3. Mohd Ishtiyak, Subhendu Jana, R. Karthikeyan, M. Ramesh, Bikash Tripathy, Sairam K. Malladi, Manish K. Niranjana, and **Jai Prakash**, Syntheses of Five New Layered Quaternary Chalcogenides SrScCuSe_3 , SrScCuTe_3 , BaScCuSe_3 , BaScCuTe_3 , and BaScAgTe_3 : Crystal Structures, Thermoelectric Properties, and Electronic Structures, *Inorg. Chem. Front.*, 8 (2021) 4086.



భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్
भारतीय प्रौद्योगिकी संस्थान हैदराबाद
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Kishore Natte

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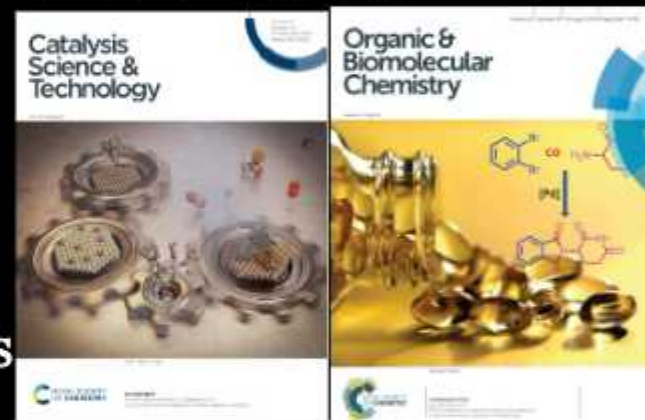


Major Areas of Research/Up to 3 major sponsored projects

- 1) Catalysis for Applied Organic Synthesis, Hydrogen generation, and Utilization
- 2) Hydrogenation of Arenes and Heteroarenes; Fine and Bulk chemicals (SERB)
- 3) Organofluorine and Pharmaceutical Chemistry

Major Research Facilities in the Group

- 1) Rotary Evaporators, LED lamps (Kessil)
- 2) High-pressure reactors
- 3) State-of-the-art lab ware for wet chemistry experiments



Technology/Product Developed/Up to 3 most significant Publications

- 1) R. Cauwenbergh, V. Goyal, R. Maiti, **K. Natte**,* S. Das, *Chem. Soc. Rev.*, 2022, 51, 9371-9423, Challenges and Recent Advancements in the Transformation of CO₂ to Carboxylic acids: Straightforward Assembly with homogeneous 3d Metals.
- 2) **K. Natte**, H. Neumann, M. Beller, R. V. Jagadeesh: *Angew Chem. Int. Ed.*, 2017, 56, 6384-6394, Catalytic Utilization of Methanol as a C1 Source in Chemical Synthesis
- 3) **K. Natte**, R. V. Jagadeesh, H. Neumann, M. Beller: *Nat. Commun*, 2017, 1344-1353, Convenient Reductive Aminations without Hydrogen: Selective Iron-catalyzed Synthesis of N-Methylamines



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Koyel Banerjee Ghosh

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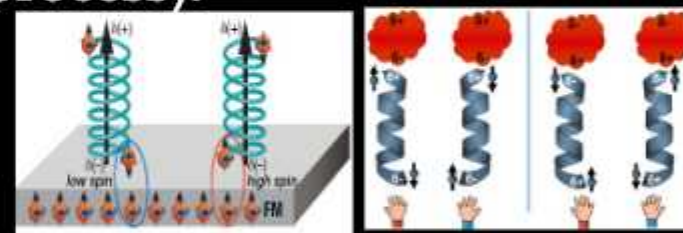
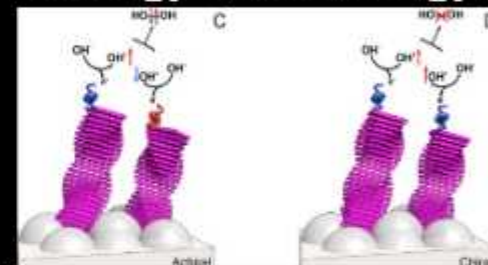


Major Areas of Research/Up to 3 major sponsored projects

1. Spin-dependent electrochemistry and its application in clean energy technology.
2. Surface chemistry and heterogeneous catalysis
3. Spin-controlled electron transfer through proteins

Major Research Facilities in the Group

1. Electrochemical workstation (Procurement is under process).
2. UV-VIS spectrophotometer (Procurement is under process).



Technology/Product Developed/Up to 3 most significant Publications

1. **Koyel Banerjee-Ghosh**, Oren Ben Dor, Francesco Tassinari, Eyal Capua, Shira Yochelis, Amir Capua, See-Hun Yang, Stuart Stephen Papworth Parkin, Soumyajit Sarkar, Leeor Kronik, Lech Tomasz Baczewski, Ron Naaman and Yossi Paltiel, "Separation of Enantiomers by Enantio-Specific Interaction of Chiral Molecules with Magnetic Substrates", *Science*, **360**, 2018, 1331–1334.
2. **Koyel Banerjee-Ghosh**, Shirsendu Ghosh, Hisham Mazal, Inbal Riven, Gilad Haran, Ron Naaman, "Long-range charge reorganization as an allosteric control signal in proteins", *J. Am. Chem. Soc.*, **142**, 2020, 20456–20462.
3. Wenyan Zhang, **Koyel Banerjee-Ghosh**, Francesco Tassinari, and Ron Naaman, "Enhanced Electrochemical Water Splitting with Chiral Molecule-Coated Fe₃O₄ Nanoparticles", *ACS Energy Lett.*, **3**, 2018,

2308–2313.



Krishna Gavvala

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Major Areas of Research/Up to 3 major sponsored projects

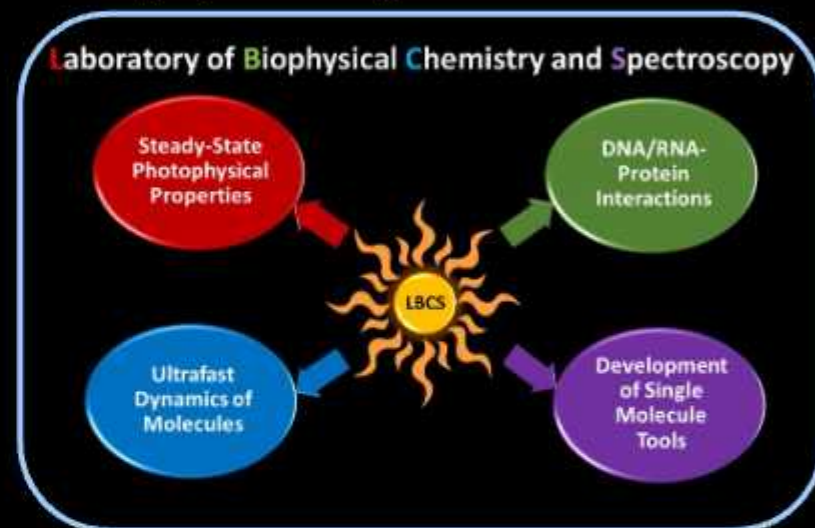
- 1) Exploring Protein-DNA, Drug-DNA and Drug-Protein Interactions Using Spectroscopic Tools (SERB-SRG)
- 2) Understanding Ultrafast Excited State Dynamics of Molecules
- 3) Development of Single Molecule Fluorescence Techniques

Major Research Facilities in the Group

- 1) UV-Visible Absorption Spectrophotometer
- 2) Steady-State Fluorescence Spectrophotometer
- 3) A Wet Lab to Perform Experiments
- 4) A Dry Lab for Processing the Data

Technology/Product Developed/Up to 3 most significant Publications

- 1) Sudhanshu Sharma, Dineshbabu Takkella, Pintu Kumar, Krishna Gavvala*
Spectroscopic Analysis to Identify the Binding Site for Rifampicin on Bovine Serum Albumin
Spectrochim. Acta. A. 2022, 283, 121721.
- 2) Dineshbabu Takkella, Sudhanshu Sharma, Lara Martinez-Fernandez*, Krishna Gavvala*
Excited-State Dynamics of Imiquimod in Aqueous Solutions
J. Photochem. Photobiol. A. 2022, 431, 113998.
- 3) Ruchika Bhujbalrao, Krishna Gavvala, Reman Kumar Singh, Juhi Singh, Christian Boudier, Sutapa Chakrabarti, G Naresh Patwari*, Yves Mély*, Ruchi Anand*
Identification of Allosteric Hotspots Regulating the Ribosomal RNA Binding by Antibiotic Resistance-Confering Erm Methyltransferases
J. Biol. Chem. 2022, 298, 102208.



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Major Areas of Research/Up to 3 major sponsored projects

Synthesis and Processing of 2D materials

Supercapacitors, Hybrid metal-ion capacitors

Multivalent metal-ion batteries; On-chip energy storage

Funding: SERB-DST

Major Research Facilities in the Group

Multi-channel Battery tester, electrochemical workstation

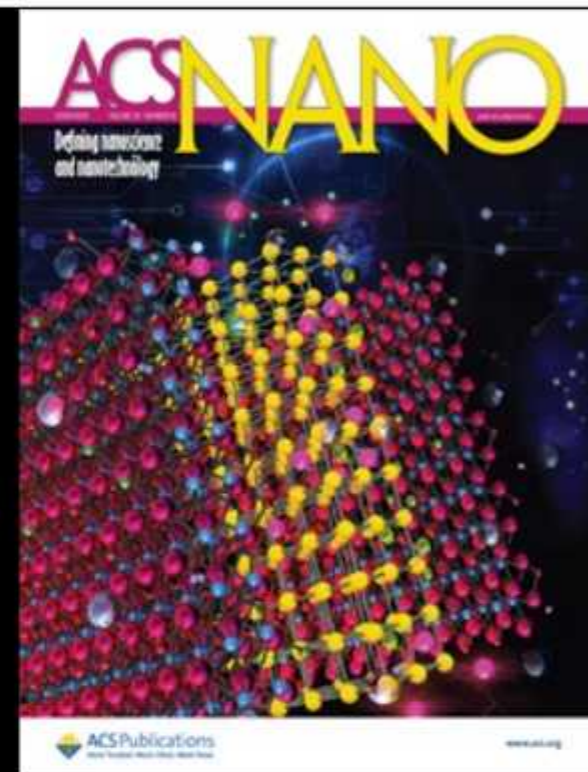
Glove box, Crimping/decrimping machine

Technology/Product Developed/Up to 3 most significant Publications

N. Kurra* et al., Journal of Energy Storage, 2022, 55, Part C, 105702.

N. Kurra* et al., Energy Storage Materials, 2021, 39, 347.

H. Saini et al., ACS Nano, 2021, 15, 18742.



Ganesan Prabu Sankar

Professor, Organometallics and Materials Chemistry Lab, Department of Chemistry

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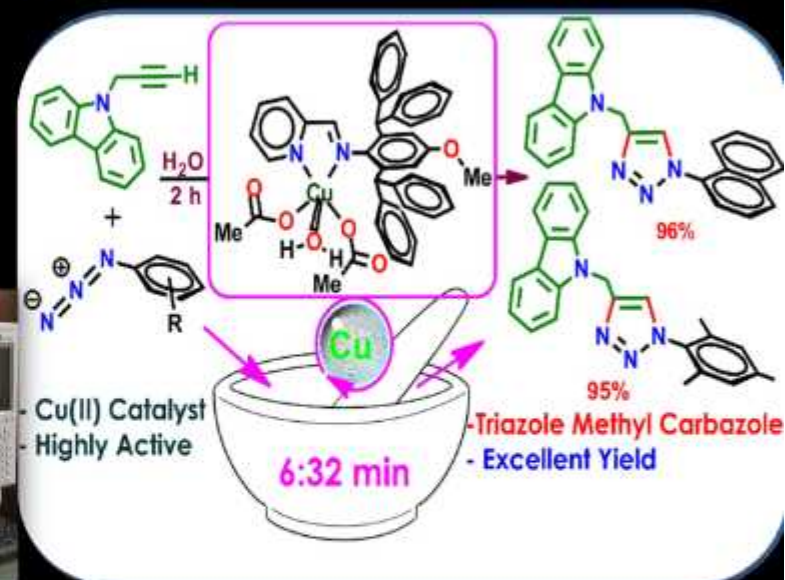


Major Areas of Research/Up to 3 major sponsored projects

- N-Heterocyclic Carbenes (NHC)
- Cu, Ni, Co, Pd, Au, Ru, Zn-NHC Catalysts
- Bismuth Catalysts
- C-S Cross-Coupling Reactions & Click Chemistry

Major Research Facilities in the Group

GC-MS, Fluorescence spectrometer (VT, solid-state & Solution state), UV-vis spectrometer, Cyclic Voltammetry, Glove Box, Solvent Purification System, ESR & SXRD



Technology/Product Developed/Up to 3 most significant Publications

Chemistry-An Asian Journal, 2022, 17(18), e202200594.

Catalysis Letter 2022, 1-11.

Chemistry-An Asian Journal, 2023, 18, asia.202201138.





Priyadarshi Chakraborty

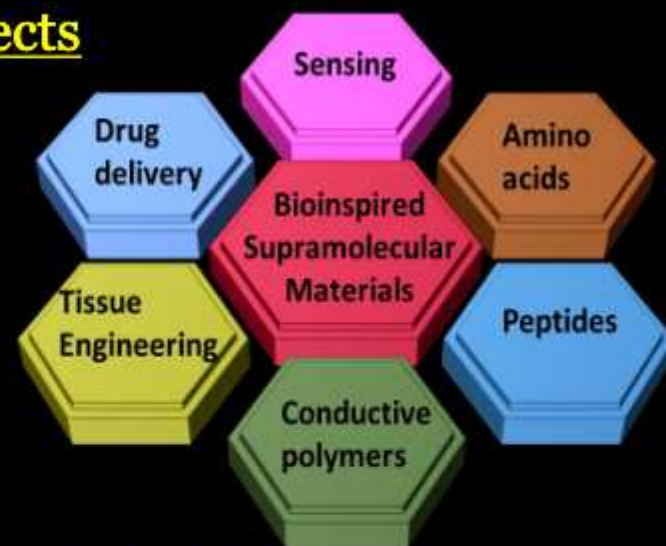
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Major Areas of Research/Up to 3 major sponsored projects

Areas of Research: Self-assembly, Co-assembly, Hydrogels, Conductive polymers, tissue engineering, cell culture, drug delivery.

Sponsored projects: Ramalingaswami Grant (DBT) on Cardiac tissue engineering.



Major Research Facilities in the Group

Chemistry Department facilities including UV- Vis, FTIR, XRD, NMR, DSC.

Technology/Product Developed/Up to 3 most significant Publications

1. Nano-Engineered Peptide-Based Antimicrobial Conductive Supramolecular Biomaterial for Cardiac Tissue Engineering. P. Chakraborty, H. Oved, D. Bychenko, Y. Yao, Y. Tang, S. Zilberzwige-Tal, G. Wei, T. Dvir and E. Gazit, *Advanced Materials*, 2021, **33**, 2008715.
2. Unusual two-step assembly of a minimalistic dipeptide-based functional hypergelator. P. Chakraborty, Y. Tang, T. Yamamoto, Y. Yao, T. Guterman, S. Zilberzwige-Tal, N. Adadi, W. Ji, T. Dvir, A. Ramamoorthy, G. Wei, E. Gazit, *Advanced Materials* 2020, **32**, 1906043.
3. A Self-Healing, All-Organic, Conducting, Composite Peptide Hydrogel as Pressure Sensor and Electrogenic Cell Soft Substrate. P. Chakraborty, T. Guterman, N. Adadi, M. Yadid, T. Brosh, L. Adler-Abramovich, T. Dvir and E. Gazit, *ACS Nano* 2019, **13**, 163-175.





Gedu Satyanarayana

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Areas of Research:

Transition Metal Catalysis

Site Selective C–H Activation

Acid-Promoted Domino Processes

Electrochemical Organic Transformations

Lab facilities:

ElectraSyn 2.0

Microwave Synthesizer

Key publications:

1. Karu Ramesh, Gedu Satyanarayana. *Green Chem.*, **2018**, *20*, 369–374.
2. Perla Ramesh, Chinnabattigalla Sreenivasulu, Dakoju Ravi Kishore, Dasari Srinivas, Koteswara Rao Gorantla, Bhabani S. Mallik* and Gedu Satyanarayana*. *J. Org. Chem.* **2022**, *87*, 5, 2204–2221.
3. Dasari Srinivas, Gedu Satyanarayana. *Org. Lett.* **2021**, *23*, 19, 7353–7358.



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Saurabh Kumar Singh

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Major Areas of Research/Up to 3 major sponsored projects

Computational Exploration of Bonding and Covalency in Actinide Molecular Complexes (SERB-SRG)

Molecular Modeling of Spin-Vibronic Coupling and Magnetic Relaxation in Molecule-Based Magnets; Spin-Crossover Phenomenon

Computational Modelling of Catalytic Sites for Small Molecule Activations mediated by Transition Metal and Actinide Molecular Complexes and Metal-Organic Frameworks

Major Research Facilities in the Group

Tools for High-Level Relativistic DFT and Multiconfigurational Methods

In-house computing resource with ~ 4 nodes (~226 cores) with 192 GB RAM; One High-End Node (~56 core) with 768 GB RAM

Software Tools: Amsterdam Density Functional (ADF) Code, OpenMOLCAS, ORCA, VASP, SIESTA, Multiwfn, NBO

Technology/Product Developed/Up to 3 most significant Publications

P. Kumar, J. F. Gonzalez, P. P. Sahu, N. Ahmed, J. Acharya, V. Kumar, O. Cador, F. Pointillart, **Saurabh Kumar Singh***, V. Chandrasekhar*, "Magneto Caloric Effect and Slow Magnetic Relaxation in Peroxide-assisted Tetranuclear Lanthanide Assemblies" *Inorg. Chem. Front.* **2022**, 9, 5072-5092.

D. Shao*, S. Moorthy, Y. Zhou, Si-Tong Wu, J.-Y. Zhu, J. Yang, D.-Q. Wu*, **Saurabh Kumar Singh***, "Field-induced slow magnetic relaxation behaviours in binuclear cobalt(II) metallocycle and exchange-coupled cluster" *Dalton Trans.* **2022**, 51, 9357-9368.

D. Shao*, P. P.Sahu, W. J. Tang, Yang-Lu Zhang, Y. Zhou, X. Q. Wei*, Z. Tian*, **Saurabh Kumar Singh*** "A single-ion magnet building block strategy toward Dy₂ single-molecule magnets with enhanced magnetic performance" *Dalton Trans.* **2022**, 51, 18610-18621.



భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్
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Sivakumar Vaidyanathan,

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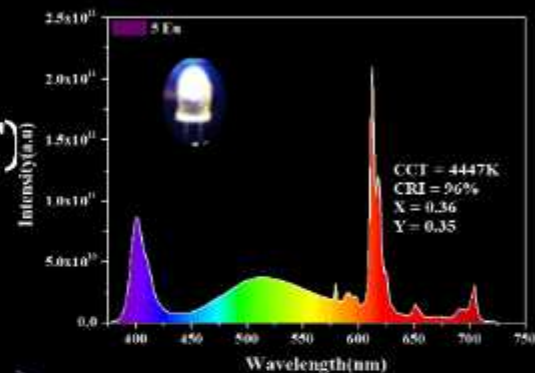
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Major Areas of Research/Up to 3 major sponsored projects

Luminescence Lanthanide complexes for smart lightings (DST)

Luminophores for organic light emitting diodes (SERB)

Phosphors for solid state lightings (including NIR emitters)

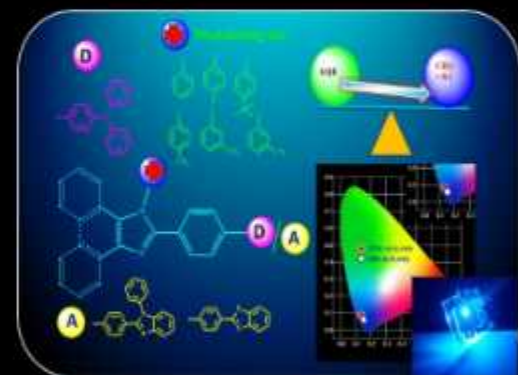
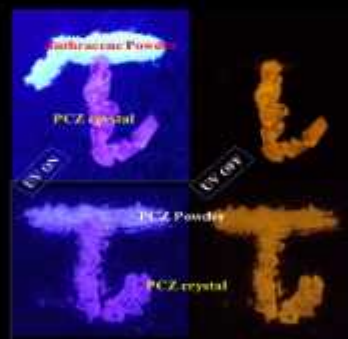
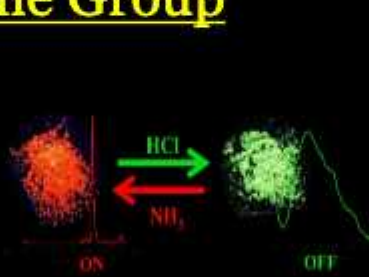


Major Research Facilities in the Group

Spectrofluorometer

Optical study – in film form

Electrochemical systems



Technology/Product Developed/Up to 3 most significant Publications

Efficient TADF yellow emitter for OLEDs

White phosphors for solid state lightings

Room temp phosphorescence organic dyes





Major Areas of Research/Up to 3 major sponsored projects

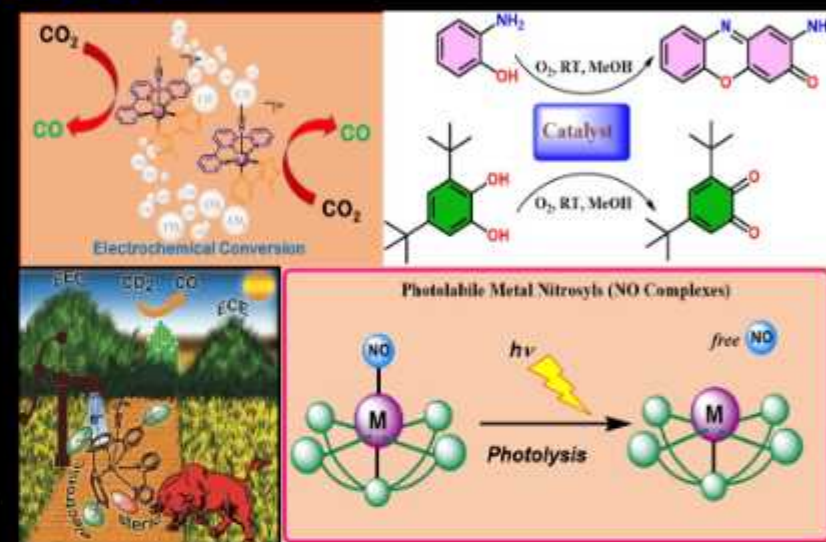
- 1) Bioinspired Catalysts for Solar fuel Production:
Photochemical WOC/ Proton Reduction/ CO₂ Reduction
- 2) Designed Photoactive Ruthenium Nitrosyls for
Site-specific NO Delivery
- 3) Mimicking Catechol Oxidase and Phenoxazinone
Synthase Activity/ DNA binding / DNA Cleavage
/ Anti-Cancer Activity

Major Research Facilities in the Group

- 1) Electrochemical setup/Spectro-electrochemical set up
- 2) UV-vis Spectrometer
- 3) Oxygraph Instrument for measuring dissolved O₂ /Cryogenic set up for
low temperature reaction

Technology/Product Developed/Up to 3 most significant Publications

- 1) Tetrazole-Substituted Isomeric Ruthenium Polypyridyl Complexes for Low Overpotential Electrocatalytic CO₂ Reduction
B. Giri, A. Mahata, T. Kella, D. Shee, F. D. Angelis, S. Maji *J. Catal.*, **2022**, *405*, 15-23.
- 2) Design, Synthesis, Structural, Spectral, and Redox Properties and Phenoxazinone Synthase Activity of Tripodal
Pentacoordinate
Mn(II) Complexes with Impressive Turnover Numbers
S. Kumbhakar, B. Giri, A. Muley, K. S. Karumban, S. Maji *Dalton Trans.*, **2021**, *50*, 16601-16612.
- 3) Near-IR Light-Induced Photorelease of Nitric Oxide (NO) on Ruthenium Nitrosyl Complexes: Formation, Reactivity, and
Biological
Effects
B. Giri, T. Saini, S. Kumbhakar, K. S. K, A. Muley, A. Misra, S. Maji *Dalton Trans.*, **2020**, *49*, 10772 – 10785.





Sudarsanam Putla

Assistant Professor, HeteroCat Lab, Department of Chemistry

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Major Areas of Research/Up to 3 major sponsored projects

Heterogeneous catalysis

Biomass conversion

C-N bond construction

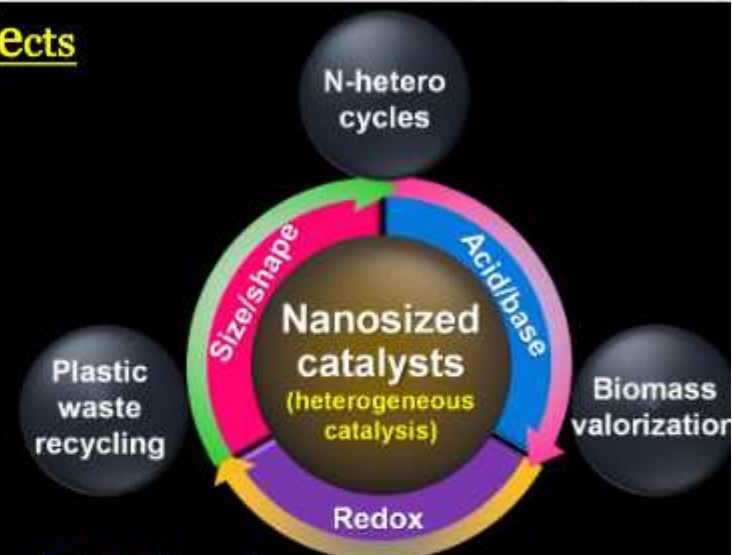
Plastic waste recycling

Major Research Facilities in the Group

GC

Centrifuge

Technology/Product Developed/Up to 3 most significant Publications



1. N. S. Bhat, S. L. Hegde, S. Dutta,* P. Sudarsanam*. Efficient synthesis of 5 (hydroxymethyl)furfural esters from polymeric carbohydrates using 5 (chloromethyl)furfural as a reactive intermediate, ACS Sustainable Chemistry & Engineering 10 (2022) 5803–5809.

2. P. Sudarsanam,* A. Köckritz, H. Atia, M.H. Amin, A. Brückner*. Synergistic nanostructured MnO_x/TiO₂ catalyst for highly selective synthesis of aromatic imines. ChemCatChem 13 (2021) 1990-1997.

3. P. Sudarsanam,* E. Peeters, E.V. Makshina, V.I. Parvulescu, B.F. Sels*. Advances in porous and nanoscale catalysts for viable biomass conversion. Chemical Society 2421.



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Surajit Maity

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Major Areas of Research

Excited State Photophysical Processes of Isolated Microsolvated Molecules

Spectroscopic characterization of molecular docking on the surface of biomolecular prototypes

Electronic Structure and Properties of Isolated Metal Complexes in the Gas Phase

Major Research Facilities in the Group

Molecular Beam Machine equipped with LIF, DF, TOF-Mass spectrometer set-up

UV-VIS/ IR OPO (200-4000 nm, 1 cm⁻¹ resolution, ns-pulsed laser system)

Laser ablation set-up for molecular reaction under plasma conditions

Technology/Product Developed/Up to 3 most significant Publications

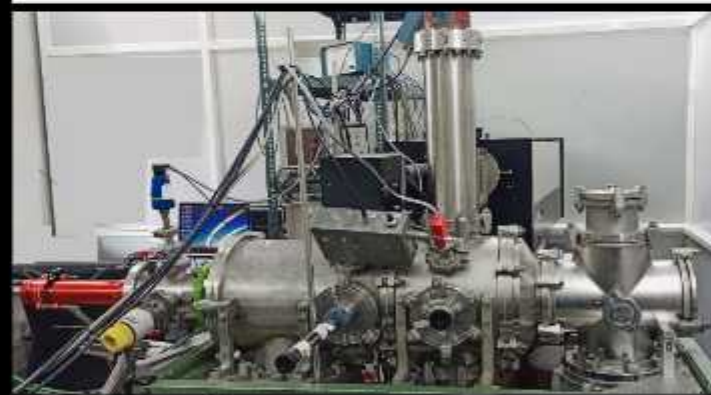
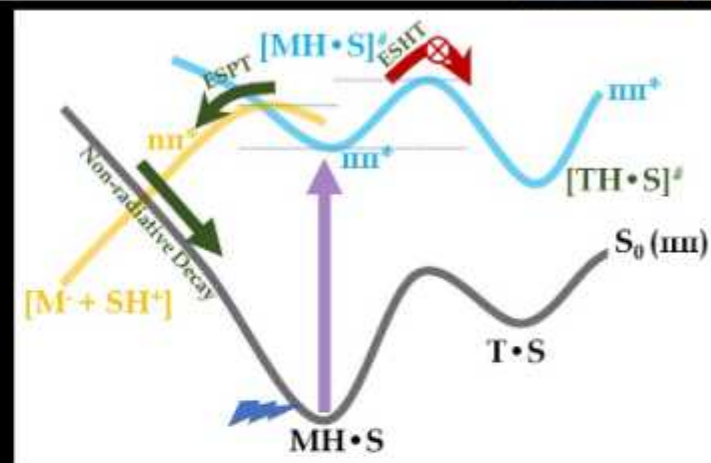
Developed methodologies to measure excited state energy barriers spectroscopically

Demonstrate method to quantitatively describe the kinetic isotope effect upon state-specific electronic excitation

S. Khodia, Ramesh J. and S. Maity, Phys. Chem. Chem. Phys., 2022, doi.org/10.1039/D2CP04676H

S. Khodia and S. Maity, Phys. Chem. Chem. Phys., 2022,24, 12043-12051; doi.org/10.1039/D2CP01121B

S. Baweja, P. Roy Chowdhury, S. Maity, Spectrochim. Acta A: Mol. Biomol. Spectros. 2022, 265, 120386





Surendra Kumar Martha

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Electrochemical Energy Storage Lab, Department of Chemistry

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Major Areas of Research

- High energy, less/No cobalt Lithium-ion batteries.
- Sodium ion batteries.
- Dual- carbon (metal-free) batteries.
- Li-ion, Lead-carbon hybrid ultracapacitors
- Recycling Li-ion batteries.

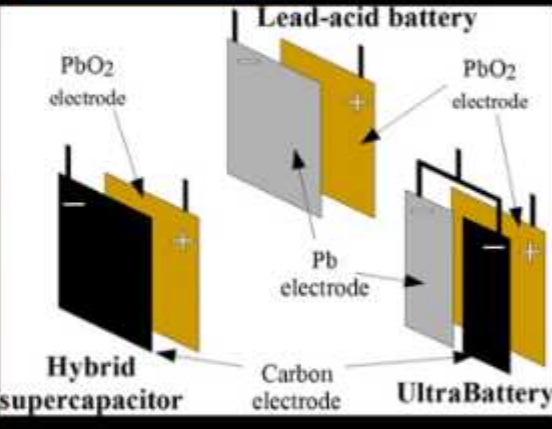
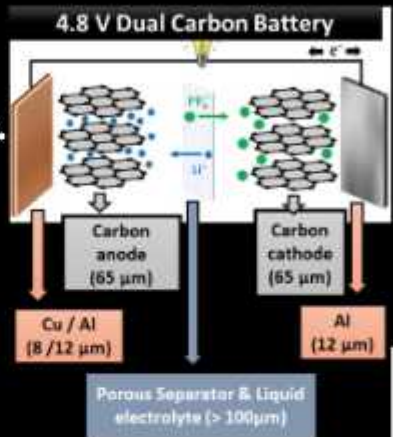
Major Research Facilities in the Group

- Glove boxes for coin cell and pouch cell assembly.
- Battery cyclers, potentiostats and galvanostats.
- Pouch cell assembly (partially).
- Material synthesis apparatus.

Technology/Product Developed/Up to 3 most significant Publications

1. LMR-NMC cathodes and Si-C anodes for High energy, Lithium-ion batteries.
2. 4.8 V Dual- carbon metal free batteries.
3. 2.75 V, 14 Wh kg⁻¹ Li-ion hybrid ultracapacitors.
4. Cost-effective hydrometallurgical processes for Recycling Li-ion batteries.

Ref. *Advanced Energy Materials*, 2100135 (2021), *ACS Sustainable Chem. Eng.* 2022,10, 23, 7515.



Tarun K. Panda

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Department of Chemistry

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Major Areas of Research/Up to 3 major sponsored projects

- 1) Synthesis and Application of various organo-earth abundant metal complexes
- 2) Atom-efficient catalytic C-X (X = N, O, S, P, C, B, Si) bond formation using earth-abundant catalysts
- 3) Ring opening Polymerization (ROP) of cyclic esters and amides using earth-abundant metal catalysts

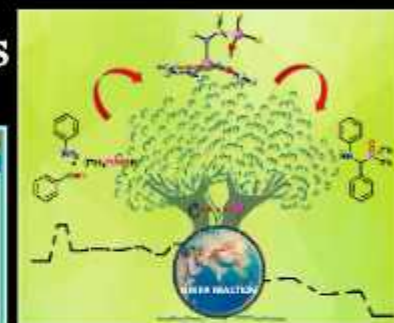
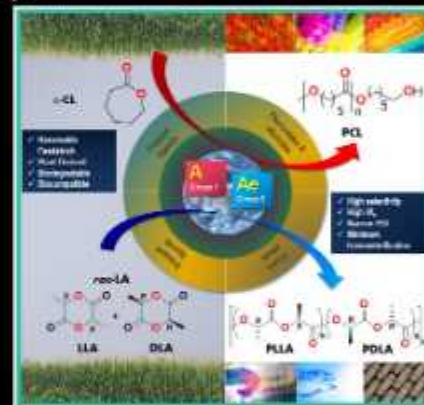
Major Research Facilities in the Group

MBRAUN Glove Box Workstations

Gel Permeation Chromatography (GPC) System

Mass Spectrometer

High-Pressure Reactor



Technology/Product Developed/Up to 3 most significant Publications

- 1) J. Bhattacharjee, A. Sarkar and T. K. Panda, The Chemical Record, Alkali and Alkaline Earth Metal Complexes as Versatile Catalysts for Ring-Opening Polymerization of Cyclic Esters, 2021, 21, 1898-1911.
- 2) Harinath, J. Bhattacharjee, and T. K. Panda, Facile Reduction of Carboxylic Acids to Primary Alcohols under Metal-free and Solvent-free Conditions, Chemical Communications, 2019, 55, 1386-1389.
- 3) J. Bhattacharjee, A. Harinath, I. Banerjee, H. P. Nayek and T. K. Panda, Highly Active Dinuclear Ti^{IV} Complexes for Catalytic Formation of Carbon – Heteroatom Bond, Inorg. Chem., 2018, 57, 12610–12623.



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Webpage Link: <https://kvrao-group.webnode.page>



Major Areas of Research/Up to 3 major sponsored projects

Supramolecular polymers; Porous organic polymers; Soft-materials
Organic semiconductors

Major Research Facilities in the Group

UV-Vis-NIR spectrometer with temperature control (-10 to 100 °C)
Fluorescence spectrometer
Microwave synthesizer



Technology/Product Developed/Up to 3 most significant Publications

1. Post-synthetic π -extension of perylene conjugated porous polymer via APEX reactions: tunable optical and gas storage properties,
DS Ingle, AC Yadav, K Kumari, SKK Singh, DJ Babu, KV Rao
Chem. Commun. DOI: 10.1039/D2CC05340C
2. Supramolecular depolymerization in the mixture of two poor solvents: mechanistic insights and modulation of supramolecular polymerization of ionic π -systems
S Kotha, MFJ Mabesoone, D Srideep, R Sahu, SK Reddy, KV Rao
Angew. Chem., Int. Ed., **2021**, *60*, 5459
3. Synthesis and Self-assembly of Benzoperylene Benzimidazoles: Tunable Morphology with Aggregation-Induced Enhanced Emission
D Srideep, K Sriram, S Kotha, DJ Babu, SK Singh, KV Rao
Chem. – Asian J., **2022**, *17*, e202200099



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