

Dr. Chetan Mistari

CONTACT

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PROFILE

Innovative scientist with experience Basic, Generic, and day-to-day research, process development, new analytical method development and improvement. Specialized in thin film deposition, etching, characterization, UV lithography, and Field electron emission analysis. Highly skilled in design, development and handling of Ultra high vacuum and High Vacuum systems such as e-beam, PECVD, CVD, PVD, dual chamber UHV system and sputtering system for deposition.

AWARDS AND HONOURS

- **Best Oral Presentation award for Indo-Japan Sakura Science Program(2022)**
- **Best Oral Presentation award at International Conference held by SRM University(2021)**
- Recipient of **Junior and Senior Research Fellowship** by MAHAJOTHI, India(2018–2023)
- Individually setup the UV Photolithography lab.

EXPERIENCE

- **Postdoctoral fellow - Jan2024- Present**
Department of Instrumentation and Applied Physics, IISc, Bangalore, Karnataka.
- Synthesis of single layer graphene, MWCNT and various TMD materials using CVD method and its application.
- **Materials Scientist –(JUL2023– Jan 2024)**
GLEAM INNOVATIONS PVT. LTD. -Bangalore, Karnataka
- Successfully completed the project; Formation of diamond based nozzles for 3D printer.
- Project leader, Polycrystalline diamond defect analysis using several characterizations to assess the impact of different PECVD growth parameters and enhance a diamond's growth rate and quality.
- Researched, developed and successfully analyze the application of Boron Doped and Nitrogen doped diamond as Field electron emitter.
- Participated and successfully completed the 15 days Hands on training workshop at Center for NanoScience and Engineering (CeNSE), IISc, Bangalore.

SKILLS

- Handling UHV system individually.
- **Class100** clean room environment experience
- Data analysis skills using various characterization techniques
- Defect analysis
- Problem solving
- UV lithography
- **Process development & optimization**
- **Process Failure Analysis(FMEA)**
- Problem solving
- Public Speaking and Leadership
- Critical thinking

Design and development of Vacuum systems: 3 ChamberHFCVD,2 chambers UHV Field electron emission setup, PVD(sputtering and evaporation)

Fabrication Techniques: UV lithography, E-beam evaporation, Thermal Evaporator

Characterization Techniques: Depth Profilometry, SEM, TEM, AFM, XRD, EDX, UV-Vis Spectroscopy, Raman Spectroscopy, FTIR, XPS, UPS, I-V Measurement, Hall Measurement.

Software Tools: Origin, Casa XPS, XPSPEAK41, Xpert Highscore, ENDNOTE,

Programming: Fortran, Python, Microsoft Office

Other Skills: Lithography, Wet Etching, Lift-off, Mechanical exfoliation, Sample preparation for TEM, XPS, UPS, Hall Measurement, Nanomaterials synthesis using chemical reduction, hydrothermal method, Solvothermal method, Sol-gel, Electrophoretic deposition, CVD(Single layer graphene, MWCNT and Single layer and few layer 2D TMD's).

POSITIONS OF RESPONSIBILITY

Team lead (Materials and characterization division) (JUL 2023 –Jan 2024)- Gleam Innovations Pvt. Ltd

Online tutoring – (JUL 2014 – JUN 2017),– Smarthinking.com

Lecturer–(JUL2017–APL-2018)–Nawrosjee Wadia Collage Pune.

Teaching assistance–Materials Science and Semiconductor theory.(APL-2020–APL–2022)-SPPU, Pune.

EDUCATION

Ph.D.– APRIL2018-MAY2023

Savitribai Phule Pune University- Pune, Maharashtra, India.

THESIS TITLE: Synthesis, structural and field electron emission characterization of 2D Transition Metal Dichalcogenides and its composite with graphene or metal oxides.

SUPERVISORS: Prof. Mahendra A. More

- Indigenously developed UV Photolithography setup.
- Assembled 3 chamber HFCVD and 2 chamber UHV system with Advanced Process Technology (APT), Pune.
- Actively completed two projects with CeNSE, IISc, Bangalore.
 1. Formation of Si-tip array using e-beam lithography and Reactive Ion Etching (RIE) on Silicon using photolithography and its application as field electron emitter.
 2. Formation of CuS nanosheets using Solvothermal method and its application as IR detector.
- Formation of miniature X-ray tube using MoS₂-MWCNT as electron emission source.
- Guided and trained a batch of four Junior research fellows.
- Guided 5 Masters student for Masters project

Master of Science (M.ScPhysics)–2011–2016

Savitribai Phule Pune University-Pune,Maharashtra. Percentage: 53.4%

PROJECT TITLE: Analysis of Field electron emission behavior of ZnO thin films synthesized using Hydrothermal and UV photolithography.

SUPERVISOR: Prof. Mahendra A. More.

PUBLICATIONS

1. ChetanDMistari,PratapMane,PankajKoinkar,BrahmanandaChakraborty,MahendraA More.FieldelectronemissionperformanceofJanus MoS₂ and MoS₂-MWCNTs composite: Corroboration by Hall measurement and DFT simulation. 10.1016/j.jallcom.2023.171356
 2. CDMistari,MAMore.Synthesis,physico-chemicalcharacterizationandfieldemissionbehaviourof3DchrysanthemumlikepristineReS₂,and ReS₂-rGO nanocomposite Nano Express 2 (2), 020018
 3. SKarmakar,BRaviteja,ChetanDMistari,VanshreeParey,RanjitThapa,MAMore,DBehera Superiorfieldemissionandalternatingcurrent conduction mechanisms for grains and grain boundaries in an NiO-[CdO] 2 nanocomposites Journal of Physics and Chemistry of Solids, 2020
 4. SKarmakar,VanshreeParey,ChetanDMistari,RanjitThapa,MAMore,DBeheraElectricfieldemissionandanomaliesofelectricalconductivity above room temperature in heterogeneous NiO-SnO₂ nano-ceramic composites Journal of Applied Physics, 2020
 5. SachinRSuryawanshi, ChetanDMistari,AnilK Singh,DeodattaMPhase,DattatrayJLate,SucharitaSinha,MahendraAMoreAFacile Approach towardsFabricationofGdB₆-ZnOHeteroarchitectureasHighCurrentDensityColdCathode.ChemistrySelect,2016
 6. SKarmakar,ChetanDMistari,VanshreeParey,RanjitThapa,MAMore,DBehera.MicroporousnetworksofNiMn₂O₄asapotentialcathode material for electric field emission Applied Physics, 2019
 7. RajuTShisode,SachinRSuryawanshi,ChetanDMistari,DattatrayJLate,MahendraAMore.EnhancedFieldEmissionCharacteristicsofa3D HierarchicalHfO₂-ZnOHeteroarchitectureChemistrySelect,2017
 8. SKarmakar,ChetanDMistari,AntaraVaidyanathan,MAMore, BrahmanandaChakraborty,DBeheraComparisonofelectrochemicalresponseand electric field emission characteristics of pristine La₂NiO₄ and La₂NiO₄/CNT composites: Origin of multi-functionality with theoretical penetration by density functional theory Electrochimica Acta, 2021
 9. Subrata Karmakar, Chetan D Mistari, Afsal S Shajahan, Mahendra A More, Brahmananda Chakraborty, Dhruvananda Behera. Enhancement of pseudocapacitivebehavior,cyclicperformance,andfieldemissioncharacteristicsof reducedgrapheneoxidereinforcedNiGa₂O₄nanostructured electrode: a first principles calculation to correlate with experimental observation. The Journal of Physical Chemistry C, 2021
 10. SubrataKarmakar,VanshreeParey, ChetanDMistari,RanjitThapa,MahendraAMore,DhruvanandaBehera.Fowler–Nordheim Law Correlated withImprovedFieldEmissioninSelf-AssembledNiCr₂O₄Nanosheets.physicacstatussolidi(a),2020
 11. Subrata Karmakar, Deepak S Gavali, Chetan D Mistari, Ranjit Thapa, MA More, Dhruvananda Behera, Ariful Haque. Low-Temperature Spin-CantedMagnetismandBipolaronFreezingElectricalTransitioninPotentialElectronFieldEmitterNdNiO₃.ACSAppliedElectronicMaterials,2022
 12. Subrata Karmakar, Pratap Mane, Chetan D Mistari, Mahendra A More, Brahmananda Chakraborty, Dhruvananda Behera. Polaron assisted electricaltransportandfertilefieldemissionresponseinpolycrystallineLiNi_{0.33}Co_{0.33}Mn_{0.33}O₂withtheoretical insightbydensityfunctional theory. Journal of Alloys and Compounds, 2022
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