

Nanoscience and Soft matter Laboratory

The lab currently is involved in advancement of research works relating material science, bio-photonics and bio-physical evaluation of nanomaterials.

Present Members



Mr Samiran Hazarika

Thesis Title: Gadolinium oxide and oxyfluoride nanosystems: relevant studies as regards optical, rheological and biophysical applications

E-mail: samtezu@tezu.ernet.in; spl.inassam@gmail.com

Contact number: (03712) 267008 (Ext. 5569); +91 9707690590

Currently a post-doc fellow at IIT Madras



Ms Rizwin Khanam

Thesis title: Studies on optoelectronic, photocatalytic and energetic ion irradiation aspects of nanotitania systems

Email: rizwin1@tezu.ernet.in; rizwinkhanam@gmail.com

Contact number: (03712) 267008 (Ext. 5569)



Ms Swati Nawami Aideo

Research Area: Biophotonics and surface properties of natural systems

Email: snaideo@tezu.ernet.in; sswatinawami@gmail.com

Contact number: (03712) 267008 (Ext. 5569)



Saurabh Jyoti Hazarika

Research Area: Transition metal dichalcogenide systems, radiation effects and applications

Email: saurabh@tezu.ernet.in; saurabh2say@gmail.com

Contact number: (03712) 267008 (Ext. 5569); +91 8822397289



Ms Amrita Deka

Research Area: Semiconductor quantum dots through green route and nanobio-interface application

Email: amrita@tezu.ernet.in; amrita1937@gmail.com

Contact number: (03712) 267008 (Ext. 5569)



Md. Aftab Ansari

Research Area: Physical and bio-physical application of rare-earth oxide nano-system'.

Email: aftyfi9@gmail.com, afty@tezu.ernet.in

Contact number: (03712) 267008 (Ext. 5569), 9706785486,

Lab Alumni



Dr. Upamanyu Das

Thesis title: Development of binary semiconductor elongated nanopatterns

E-mail: upam2005@gmail.com

Contact number: +91 9706011265 (M)

Presently he is working as an assistant professor in the department of Physics, Rajiv Gandhi University, Arunachal Pradesh



Dr. Nabanita Dutta

Thesis Title: Optical properties of semiconductor quantum dots, interacting quantum dots and nanomaterial filled SHI induced ion tracks

E-mail: go2nabanita@gmail.com



Dr. Sayan Bayan

Thesis title: Investigation of optoelectronic and photonic properties of ZnO nanoscale system fabricated via physico-chemical routes

E-mail: sayan.bayan@gmail.com

Contact number:: +91 9706035529 (M)

Presently working as a Post Doctoral Fellow in IIT Kharagpur



Dr. Manasi Devi

Thesis Title: Synthesis, characterization and study on the magneto-optic effect of ferrofluids

E-mail: manasidevi25@gmail.com

Contact no: +91 9864436701 (M)

(Presently working as Ad-hoc Faculty at Darrang College, Tezpur)



Dr. Runjun Sarma

Thesis title: Synthesis, characterization and biofunctionalization of quantum dots and application in electrophysiology.

E-mail: runjun.sarma@gmail.com



Dr. Nibedita Paul

Thesis title: Nanoscale rare earth oxide and rare earth ion doped semiconductor oxide: synthesis and application in rheology and photo catalysis.

Email: paul.nibedita1@gmail.com

Presently working as an assistant professor in the department of Physics, NIT Nagaland



Dr Manjit Borah

Thesis Title: "Fabrication and optical, electrical and dielectric properties of lead-free perovskite-based nanostructured ferroelectric systems with inclusion of suitable dopants"

E-mail: manjit@tezu.ernet.in; manjit244@gmail.com

Contact number: (03712) 267008 (Ext. 5569); +91 8876505265

(Presently he is working as an assistant professor in Goalpara College, Assam)

Major Research Projects :

Completed projects :

- **Swift heavy ion Nanoarray patterning for optoelectric devices.**
 - ✓ **Principal investigator: Dr. D. Mohanta**
 - ✓ **Funded by: IUAC, New Delhi**
 - ✓ **Grant sanctioned: ₹ 2,61,000**
 - ✓ **Duration: 3 years (2004-2007)**

- **Development of ZnO Nanorods for luminescent device application**
 - ✓ **Principal investigator: Dr. D. Mohanta**
 - ✓ **Funded by: IUAC, New Delhi**
 - ✓ **Grant sanctioned: ₹ 3,33,000**
 - ✓ **Duration: 3 years (2008-2011)**

- **Fluorescent nanaocrystal induced ion channel for biomolecular labeling application.**
 - ✓ **Principal investigator: Dr. D. Mohanta**
 - ✓ **Funded by: DST, New Delhi**
 - ✓ **Grant sanctioned: ₹ 20,04,000**
 - ✓ **Duration: 3 years (2009-2012)**

- **Fluorescent nanaocrystal induced ion channel for biomolecular labeling application.**
 - ✓ **Principal investigator: Dr. D. Mohanta**
 - ✓ **Funded by: DST, New Delhi**
 - ✓ **Grant sanctioned: ₹ 20,04,000**
 - ✓ **Duration: 3 years (2009-2012)**

- **Investigation of magneto-viscous and magneto optic properties of novel ferrofluids**
 - ✓ **Principal investigator: Dr. D. Mohanta**
 - ✓ **Funded by: UGC**
 - ✓ **Grant sanctioned: ₹ 11,33,000**
 - ✓ **Duration: 3 years (2010-2013)**

- **Photonic properties of rare-earth doped nanoscale oxide semiconductors subjected energetic ion irradiation**
 - ✓ **Principal investigator: Dr. D. Mohanta**

- ✓ **Funded by:** IUAC, New Delhi
- ✓ **Grant sanctioned:** ₹ 6,03,000
- ✓ **Duration:** 3 years (2011-2014)
- ✓
- **Effect of ion irradiation on nanostructured transition metal dichalcogenide systems**
 - ✓ **Principal investigator:** Dr. D. Mohanta
 - ✓ **Funded by:** IUAC, New Delhi
 - ✓ **Grant sanctioned:** ₹ 5,79,000
 - ✓ **Duration:** 3 years (2014-2017)

Ongoing project:

- **“Studies on bifunctional (wetting-dewetting and biophotonic colouration) properties of certain natural systems of biological origin”**
 - ✓ **Principal investigator:** Dr. D. Mohanta
 - ✓ **Funded by:** DST-SERB
 - ✓ **Grant sanctioned:** ₹ 5,79,000
 - ✓ **Duration:** 3 years (2017-2020)

Recent Publications

2017

- Noticeable red emission and Raman active modes in nanoscale gadolinium oxyfluoride (Gd₄O₃F₆) systems with Eu³⁺ inclusion, S. Hazarika, D.Mohanta, *Appl. Phys. A* 123(5):382 (2017). [DOI:10.1007/s00339-017-0987-1](https://doi.org/10.1007/s00339-017-0987-1)
- Inorganic fullerene type WS₂ nanoparticles: processing, characterization and its photocatalytic performance on Malachite Green, S.J. Hazarika, D.Mohanta, *Appl. Phys. A* 123(5):381 (2017). [DOI:10.1007/s00339-017-0965-7](https://doi.org/10.1007/s00339-017-0965-7)
- Anomalous carrier life-time relaxation mediated by head group interaction in surface anchored MnSe quantum dots conjugated with albumin proteins,

R. Sarma, D. Mohanta, *Mater. Chem. Phys.* 187, 46-53 (2017). DOI:10.1016/j.matchemphys.2016.11.043

2016

- Sol-hydrothermally derived gadolinium oxide (Gd₂O₃) nanorods and tamarind-like shape evolution under 80 MeV C⁶⁺ ion impact, Samiran Hazarika, D. Mohanta, *Rad. Effects and Defects in Solids*. 171, 925-935 (2016). DOI:10.1080/10420150.2016.1259238
- Investigation of manifestation of optical properties of butterfly wings with nanoscale zinc oxide incorporation, Swati N. Aideo, D. Mohanta, *J. Phys.: Conf. Series* 765 (2016) 012019 doi:10.1088/1742-6596/765/1/012019
- Effect of ion irradiation on nanoscale TiS₂ systems with suppressed titania phase, Saurabh J Hazarika, D. Mohanta, A. Tripathi, D. Kanjilal, *J. Phys.: Conf. Series* 765 (2016) 012007 DOI:10.1088/1742-6596/765/1/012007
- Evaluation of optoelectronic response and Raman active modes in Tb³⁺ and Eu³⁺ doped gadolinium oxide (Gd₂O₃) nano particle systems, N. Paul, D. Mohanta, *Appl. Phys. A* 122 (In Press, 2016). DOI:10.1007/s00339-016-0347-6
- Limiting hydrophobic behavior and reflectance response of dragonfly and damselfly wings, Swati N Aideo, D. Mohanta, *Appl. Surf. Sci.* 387(30), 609-616 (2016). DOI:10.1016/j.apsusc.2016.06.049
- Studies on electrophoretically deposited nanostructured barium titanate systems and carrier transport phenomena, M. Borah, and D. Mohanta, *Appl. Phys. A* 122(6):627 (2016). DOI: 10.1007/s00339-016-0136-2.
- Modified structural and frequency dependent impedance formalism of nanoscale BaTiO₃ due to Tb inclusion, M. Borah, D. Mohanta, *AIP Conf. Proc.* 1731 (1), 050051-1-3 (2016). DOI: 10.1063/1.4947705.
- Interrelated emission and spin-spin relaxation feature mediated by VO⁺ defects in Gd₂O₃ nanorods subjected to swift ion impact, S. Hazarika, and D. Mohanta, *Phil. Mag. Lett.* 96 (04), 157-164 (2016). DOI:10.1080/09500839.2016.1184344.
- Oriented attachment (OA) mediated characteristic growth of Gd₂O₃ nanorods from nano-particles, S. Hazarika, D. Mohanta, *J. Rare Earth*, 34(2), 158-164 (2016). DOI: 10.1016/S1002-0721 (16)60009-1.

- Black titania: Effect of hydrogenation on structural and thermal stability of nanotitania, R. Khanam, D. Gogoi, B. Mondal and D. Mohanta, *Appl. Phys. A* 122:92 (2016). DOI: 10.1007/s00339-016-9618-5.
- Biogenic synthesis of silver nano-particles from *Cassia fistula* (Linn.): *In vitro* assessment of their antioxidant, antimicrobial and cytotoxic activities, Y. K. Mohanta, S. K. Panda, Kunal Biswas, A. Tamang, Jaya Bandyopadhyay, Debashis De, D. Mohanta, and A. K. Bastia, *IET-Nanobiotechnology*. (2016). DOI: 10.1049/iet-nbt.2015.0104.