

Dr Bidhan Mohanta

Assistant Professor

Department of Physics, Assam University



Educational Background

Passed MSc in Physics from Gauhati University, India, in the year 1996(97). Completed PhD in Physics from Gauhati University, India, in the year 2006. The thesis title is “Determination of trace elements in some commonly used medicinal plants and the study of their biological significance”.

Research Interests

Study of trace elements: Elements present in minute quantities $\mu\text{g/g}$ or ng/g in any material, termed as trace elements, play a major role in determining the properties of the material. They have wide implications in different disciplines ranging from archaeology, geology, art, material science to biomedical sciences. Previously I worked on the trace element contents of medicinal plants and their role in imparting therapeutic values to the plants. Also worked on trace metals presents in environment like water, soil, fish etc.

Nano materials: Synthesis of nanoparticles and their characterization. Working with gold, silver and other types of nanomaterials. Synthesis techniques involve chemical routes and sputtering methods. Current interest is on anisotropic and core-shell nanoparticles.

Expertise in experimentation

- Proton Induced X-ray Emission (PIXE)
- Energy Dispersive X-ray Fluorescence (ED-XRF)

Previous positions

Assistant Professor
RKM, Kailashahr, Tripura
(2008 – 2010)

Research Associate
IUAC, New Delhi
(2006 – 2008)

JRF & SRF
UGC-DAE CSR, Kolkata Centre
(1998 – 2005)

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- Atomic Absorption Spectroscopy (AAS)

Skills in Instrumentations/techniques

Ion Beam techniques

- Setting up of the scattering chamber for irradiation during PIXE experiments.
- Setting up of experimental modules like electronics for data acquisition
- Handling and maintenance of vacuum using rotary, diffusion, turbo pumps.
- Data analysis

Experience in other techniques/instrumentations

UV-Visible spectrophotometer, Fluorometer, FTIR, Gel-electrophoresis (PAGE for proteins and Agarose gel for DNA), Centrifuge (High speed and ultra), Lyophilizer, CO₂ incubator, Co⁶⁰ γ -chamber, cell culture, cryo preservation of cells.

Important Publications

Books

1. **Mohanta B** (2014) Cell Phone Radiation and Cancer Risk. In *Impact of Cell-phone Radiation on Environment*. Debnath D, Barthakur NK (Eds.) Publisher: Dhing College, Nagaon, Assam. pp. 71 - 79. ISBN: 978-81-925433-8-3.
2. **B. Mohanta** (2013) Nuclear Power for Energy Security and Sustainability. In *Clean Energy Options and Nuclear Safety - Indian Perspective*. R. Pradhan, S.K. Swain, M. Acharjee (Eds), Axis Books Private Limited, New Delhi, pp. 41 – 52. ISBN: 978-93-81302-34-7.

Journals

1. Roy A., **Mohanta B** (2019) Microwave assisted green synthesis of Gold nanoparticles and its catalytic activity. *Int. J. Nano Dimmens*. 10(4):359-367.

2. Roy A, **Mohanta B** (2019) Facile phyto-mediated synthesis of gold nanoparticles and *Eupatorium odoretum* leaf extract and its size-dependent catalytic activity. *Mico & Nano Letters* 14(11):1163-1168. ISSN: 1750-0443.
3. Acharjee M, Choudhury J, Sen R, **Mohanta B** (2018) The vibrational spectra of carbon dioxide and nitrous oxide: A Lie algebraic study. *Canadian Journal of Physics*. DOI: 10.1139/cjp-2017-0387.
4. Acharya D, **Mohanta B**, Deb S, Sen AK (2018) Theoretical prediction of absorbance spectra considering the particle size distribution using Mie theory and their comparison with the experimental UV-Vis spectra of synthesized nanoparticles. *Spectroscopy letters*, DOI: 10.1080/00387010.2018.1442351.
5. Acharya D, **Mohanta B**, Pandey P, Nasiri F (2018) Antibacterial properties of Synthesized Ag and Ag@SiO₂ core-Shell nanoparticles: A Coparative Study. *Canadian Journal of Physics*. DOI: 10.1139/cjp-2067-0614.
6. Acharya D, Singha KM, Pandey P, **Mohanta B**, Rajkumari J, Singha LP (2018) Shape dependent physical mutilation and lethal effects of silver nanoparticles on bacteria. *Scientific reports* 8(1): 201
7. Acharya D, Pandey P, Nasiri F, Singha KM, **Mohanta B**, (2017) Synthesis, characterization and antibacterial effects of Ag@SiO₂ core-Shell nanoparticles. *J. Bionanoscience*. 11(5): 391-396.
8. Acharya D, **Mohanta B** (2017) Optical properties of synthesized Ag and Ag@SiO₂ core-Shell nanoparticles. *AIP conference proceedings*. 1832(1): 050155.
9. Acharya D, **Mohanta B**, Pandey P, Singha KM, Nasiri F (2017) Optical and antibacterial properties of synthesized silver nanoparticles. *Micro & Nanoletters*. 12(4): 223-226.
10. Acharjee M, Sen R, **Mohanta B** (2017) A comparative study of the vibrational spectra of HCN in exact vibron model and in mean field approximation. *Canadian Journal of Physics*. 95(2): 130-135.
11. Acharya D, Pandey P, Nasiri F, Singha KM, **Mohanta B** (2016) Optical Properties of Synthesized Colloidal Silver Nanoparticles and Their Antibacterial Effects. *J. Bionanoscience*. 10(6): 511-515.
12. Avasthi D K, Mishra YK, Singhal R, Kabiraj D, Mohapatra S, **Mohanta B**, Gohil NK, Singh N (2010) Synthesis of Plasmonic Nanocomposites for Diverse Applications. *Journal of Nanoscience and Nanotechnology*, 10(4), 2705–2712.
13. Avasthi D.K., Mishra Y.K., Singhal R., Kabiraj D., Mohapatra S., **Mohanta B.**, Gohil N.K., Singh N. (2009) Synthesis of Plasmonic Nanocomposites for Diverse Applications. *Journal of Nanoscience and Nanotechnology*, 9, 1–7.

14. Mishra Y.K., Mohapatra S., Kabiraj D., **Mohanta B.**, Lalla N.P., Pivin J.C., Avasthi D.K. (2007) Synthesis and characterization of Ag nanoparticles in silica matrix by atom beam sputtering. *Scripta Materialia* 56, 629 – 632.
15. **Mohanta B.**, Sudarshan M., Boruah M., Chakraborty A. (2007) Potential of vinca rosea extracts in modulating trace element profile: A chemopreventive approach. *Biol. Trace. Elem. Res.* 117, 139 – 151.
16. Chatterjee S., Chattopadhyay B., Mukhopadhyay S.K., **Mohanta B.**, Sudarshan M., Chakraborty A. (2007) East Calcutta wetlands as a sink of industrial heavy metals: A PIXE study, *International of PIXE*, 17: 129-142.
17. Joshi G.C., Agrawal H.M., **Mohanta B.**, Sudarshan M., Sinha A.K. (2006) Elemental Study of Nainital Lake water by EDXRF, *Nuclear Instruments and Methods in Physics Research B* 251: 223-22
18. Chakraborty A., Sudarshan M., **Mohanta B.**, Baruah M., Bhattacharya A., Sinha A.K. (2004) Trace elemental profile: an index for disease progression, *Journal of Trace Element in Experimental Medicine* 17 (4): 201-202.
19. **Mohanta B.**, Sudarshan M., Chakraborty A., Dutta R.K., Baruah M. (2003) Elemental profile in some common medicinal plants of India. Its correlation with traditional therapeutic usage, *Journal of Radio Analytical and Nuclear Chemistry*, 258 (1): 175-179.