



Dr. Dhani Soren

Designation: Assistant Professor (Guest Faculty)

Department: Physics

Institute: Indira Gandhi Institute of Technology (IGIT), Sarang
Odisha -759146, India

Contact: 7684906775

Email Id: ghanisoren1995@gmail.com

ACADEMIC BACKGROUND

Aug 2018- Jul 2024 Ph.D., Physics

KIIT Deemed to be University, Bhubaneswar, Odisha, India.

Ph.D. Dissertation Title: Functionalized Activated Carbon from Biomass: Photoluminescence, Electrical and Sensing Behaviour.

Supervisor: Prof. Puspallata Pattojoshi, and Dr. Pratap Kumar Deheri

Jul 2016-May 2018 M. Sc., Physics

KIIT Deemed to be University, Odisha, India

Cumulative Grade Point Average (CGPA): 9.35/10.00

M.Sc. Project: Optical Properties of Bamboo Charcoal Microstructures

Supervisor: Prof. Puspallata Pattojoshi

Jul 2013 -Jun 2016 B. Sc. (Physics Hons.)

KIIT Deemed to be University, Bhubaneswar, Odisha, India

Cumulative Grade Point Average (CGPA): 8.64/10.00

Oct 2011- May 2013 +2 (Intermediate), Council of Higher Secondary Education (CHSE)

Kalinga School for Socially Challenged, Bhubaneswar, Odisha
Division: 1st (60.33%)

Jun 2011 Matriculation, Board of Secondary Education (BSE)

Basingi High School, Mayurbhanj, Odisha
Division: 1st (74.16%)

AREA OF SPECIALIZATION

Condensed Matter Physics (Experimental)

RESEARCH INTERESTS

1. **Carbon Nanomaterial:** Preparation of carbon nanomaterials from biomass-based products (especially focused on bamboo, orange peel, and neem leaves), Properties evaluation (Dielectric and Photoluminescence Properties)
2. **EMI Shielding:** Research on biomass-based carbon for developing meta-materials for dielectric and EMI shielding applications.
3. **Gas and VOC Sensing:** Chemiresistive Sensor (Detection of Humidity, Ethanol, Methanol, and Ammonia), Fluorescent Sensor (Detection of Aldehyde, Ammonia, Heavy Metals).

RESEARCH SKILLS

1. **Synthesis Methods:** Carbonization-activation method, hydrothermal method, co-precipitation method, Sol-gel method
2. **Characterization Methods:** XRD, SEM, TEM, Raman, FTIR, XPS, UV-Vis, PL, and BET Surface area analysis
3. **Dielectric Measurement:** Dielectric constant, dielectric loss, AC conductivity, Impedance measurement
4. **Photoluminescence Study:** emission spectra in the visible range and up-conversion photoluminescence measurements
5. **Chemiresistive VOC Sensing Analyses:** Fabrication of sensor, Sensitivity, Stability, Selectivity, Speed of response, I~V Curve measurement and analysis
6. **Data Analysis/Measurements:** Microsoft Office, Origin Lab, Mendeley, EndNote Image J, FityK, CasaXPS, Match, X'pert Highscore, FullProf, Crystbox, Vesta, IrfanView, Adobe Illustrator, Photoshop

SUBJECTS TEACHING

M.Sc.- Solid State Physics, Mathematical Methods in Physics, Atomic & Molecular Physics, Numerical Methods & Computer Programming in C, Nano Science & Nanomaterials, Advanced Characterization Techniques

B.Tech-Engineering Physics

AWARDS AND FELLOWSHIPS

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|---------------------------|--|
| Aug 2018- Jul 2023 | National Fellowship for Higher Education of ST students (NFST) for Doctoral Research
Ministry of Tribal Affairs (MoTA), Government of India |
| Nov 2016 | University Rank Holder
Chancellor's Gold Medal for securing the highest CGPA in the B.Sc Programme (2013-2016)
KIIT Deemed to be University, Odisha |
| Oct 2011 | Best student award
Outstanding performance on 10 th standard at the State Board Secondary Examinations (2011). |

MEMBERSHIP IN PROFESSIONAL BODIES

1. Life Member: Society for Materials Chemistry (SMC), (April 2023 to date).

PEER-REVIEWED JOURNAL PUBLICATIONS (International)

1. Mehena, G., **Soren, D.**, Das, H., Tiwari, R. K., Behera, J. N., Pattojoshi, P., & Deheri, P. K. (2025). Glucose and Ammonia Sensing Using Fluorescent Carbon–Smectite Clay Nanocomposites Synthesized by One-Pot Hydrothermal Method. *ACS Applied Optical Materials*, 3(9),1958–1968.
2. George, S. D. B., Narasimman, L., Nagarajan, K., Santhanaraj, R. R., **Soren, D.**, Arockiasamy, J. J., & Veeramani, S. (2024). Microwave-assisted synthesis of Cu₂ZnSnS₄ and Cu₂Zn_{0.5}Ni_{0.5}SnS₄ nanoparticles for thin-film solar cells. *Journal of Materials Science: Materials in Electronics*, 35(34), 1-19.
3. **Soren, D.**, Mehena, G., Jayabalan, B., Mukherjee, S., Pattojoshi, P., & Deheri, P. K. (2024). Biomass-derived activated carbon nanocomposites with multicolor photoluminescence. *Fullerenes, Nanotubes and Carbon Nanostructures*, 1-13.
4. **Soren, D.**, Kumar, K., Deheri, P. K., & Pattojoshi, P. (2024). One-pot synthesis of AC/ZnO nanocomposites for highly sensitive, repeatable, and fast response humidity sensor. *Ceramics International*, 50 (17), 30422-30433.
5. **Soren, D.**, Mehena, G., Das, J. K., Behera, J. N., Pattojoshi, P., & Deheri, P. K. (2024). Structural defect-induced white light emission from synthetic Zn-rich trioctahedral smectite. *Applied Clay Science*, 251, 107317.

6. **Soren, D.**, Mehena, G., Pattojoshi, P., & Deheri, P. K. (2023). Dielectric relaxation and polaron hopping in biomass derived activated carbon. *Fullerenes, Nanotubes and Carbon Nanostructures*, 31(10), 940-952.
7. Jena, L., Sarangi, S. N., **Soren, D.**, Deheri, P. K., & Pattojoshi, P. (2022). Facile two step synthesis of chemiresistive sensor based on $\gamma\text{Fe}_2\text{O}_3$ —activated carbon composites for room temperature alcohol vapour detection. *Applied Physics A*, 128(2), 153
8. Jena, L., **Soren, D.**, Deheri, P. K., & Pattojoshi, P. (2022). Low frequency dielectric response mechanism of bamboo charcoal. *Fullerenes, Nanotubes and Carbon Nanostructures*, 30(6), 597-602.
9. Jena, L., **Soren, D.**, Deheri, P. K., & Pattojoshi, P. (2021). Preparation, characterization and optical properties evaluations of bamboo charcoal. *Current Research in Green and Sustainable Chemistry*, 4, 100077.

PATENTS

1. P. Pattojoshi, **D. Soren**, L. Jena, Photoluminescent Bamboo Charcoal Carbon. **INID201931053483 A** (Granted).
2. P.K. Deheri, P. Pattojoshi, **D. Soren**, G. Mehena, A method of producing biocarbon-based tunable negative dielectric constant materials. **Application No- 202331018682** (Published).
3. **D.Soren**, P.K. Deheri, G.Mehena, P.Pattojoshi, Method for producing a carbon-ZnO composite material. **Application No- 202431067412** (Published).
4. **D.Soren**, G.Mehena, R.K. Rout, P.K. Deheri, P.Pattojoshi, Synthesis of carbon-nanocomposites for room temperature ammonia sensing. **Application No- 202431087143**(Published).

CONFERENCE PRESENTATION

1. D. Soren. Biomass-Derived Carbon Materials for VOC Sensing, ICRAP-2025 organized by VSSUT Burla.
2. Rout, R.; Mehena, G.; **Soren, D.**; Pattojoshi, P.; Deheri, P.K. Ammonia Sensing by Photoluminescence Study of Biomass-Derived Carbon Nanoparticles and their Composites: A Comprehensive Investigation. 3rd International Conference on Innovative Research in Sciences, Technology, Agriculture, Environment, Business Management and Humanities (STAEBM-2023), organized by NIT, Srinagar, India, Virtual Conference, 13th -14th May 2023.
3. **Soren, D.**; Mehena, G.; Pattojoshi, P.; Deheri, P.K. Biomass Derived Nanostructured Carbon and its Composite for Enhanced Humidity Sensing. National Conference on

Science & Technology for Sustainable World (ISCA-2023, Bhubaneswar Chapter), held at KIIT Deemed to University, Odisha, India 14th -15th March 2023.

4. Mehena, G.; **Soren, D.**; Pattojoshi, P.; Deheri, P.K. Preparation of ZnO/Bamboo Carbon (BC) Composites for Removal of Methylene Blue (MB) Dye by adsorption and Photocatalysis. Recent Trend on Prospective Applications of Advanced Material (RTPAAM-2022), held at FM University, Odisha, India, 1st -2nd December 2022.
5. **Soren, D.**; Mehena, G.; Pattojoshi, P.; Deheri, P.K. Preparation of $\gamma\text{Fe}_2\text{O}_3$ - Activated Carbon Composite for Enhanced Ethanol Sensing. National Seminar on Sustainable Development with Women Empowerment (ISCA-2022, Bhubaneswar Chapter), organized by KIIT Deemed to be University, Odisha, India, 2nd -3rd March 2022.
6. **Soren, D.**; Deheri, P.K. Pattojoshi, P. Bamboo Charcoal: A Functional Material, Research Scholar's Day-2020, held at KIIT Deemed to be University, Bhubaneswar, Odisha, India, 10th January 2020.
7. Jena, L.; **Soren, D.**; Pattojoshi, P. Biomass-Derived Carbon Materials for Energy Storage Applications. 2nd International Conference on Processing and Characterization of Materials (ICPCM-1019), organized by National Institute of Technology (NIT), Rourkela, Odisha, India, 12th-14th December 2019.
8. Jena, L.; **Soren, D.**; Pattojoshi, P. Ethanol Sensing and Electrical Properties of Bamboo Charcoal. 2nd International Conference on Recent Trends in Material Science and Technology (ICMST-2018), organized by the Indian Institute of Space Science and Technology (IIST), Thiruvananthapuram, India, 10th -13th October 2018.

TEACHING EXPERIENCES

1. Guest Assistant Professor of Physics at Indira Gandhi Institute of Technology (IGIT), Sarang, Dhenkanal, Odisha-759146 (September 2025 - Present).
2. Assistant Professor of Physics at Kshetramohan College of Basic Science, Balasore (February 2025- August 2025)
3. Teaching Assistantship at KIIT University involved assisting with physics laboratory classes for 1st year B. Tech students in 2022.
4. Teaching Assistant at KISS University, assisting with Semiconductor Physics for B.Sc students (3rd semester in 2018-2019).

5. Guided four master's students from Utkal University for their final year project, mainly focused on preparing carbon nanostructures from biomass, water purification using the resulting product, and its dielectric properties.
6. Guided one master's student from KISS University for her final year project on synthesizing BC/ZnO composite and its photocatalytic behavior.

REFEREES

Prof. Dr. Puspallata Pattojoshi
(Ph.D. Supervisor)

Professor, Department of Physics
School of Applied Sciences
KIIT Deemed to be University, Odisha
Email: ppattojoshifpy@kiit.ac.in
Contact No: 9437386542

Dr. Pratap Kumar Deheri
(Ph.D. Co-supervisor)

Assistant Professor, Department of Chemistry
School of Applied Sciences,
KIIT Deemed to be University, Odisha
Email: pratap.deherifch@kiit.ac.in
Contact No: 9668211208