Karunakar Sahoo

Ph. D., Department of Physics,
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Career Objectives

To be a part of a progressive organization where I will get scope to enhance my knowledge and skill and thereby contribute to the growth of the organization.

Educational Qualification

2014 - 2021	Ph.D., Department of Physics, Indian Institute of Technology (Indian School of Mines), Dhanbad, Jharkhand, India.
Thesis Title:	"Synthesis of Zinc Oxide-Cellulose Nanocomposite for Application as Ultraviolet Sensor" (Thesis Supervisor: Prof. Jhasaketan Nayak)
2012 - 2013	Master of Philosophy (M. Phil), Physics Utkal University, Bhubaneswar, Odisha.
Dissertation Title:	"Multilayer Chalcogenide Thin Films and its Applications" (Thesis Supervisor: Dr. Ramakanta Naik)
Papers included:	Numerical methods in Physics, Experimental methods in Physics, Literature survey, Dissertation.
2008 - 2010	Master of Science (M. Sc.), Physics Ravenshaw University, Cuttack, Odisha.
Subjects included:	Mathematical methods of physics, Classical mechanics, Electronics, Electrodynamics and plasma physics, Quantum mechanics, Advanced quantum mechanics, Nuclear and particle physics, Solid state physics, Statistical physics.
2005 - 2008	Bachelor of Science (B. Sc.), Physics (Honours) S.R. College, Fakir Mohan University, Balasore, Odisha.
Subjects included:	Chemistry and Mathematics as pass subjects.

Publications:

I. Journals:

1. **Karunakar Sahoo,** Biswajyoti Mohanty, Amrita Biswas and Jhasaketan Nayak, "Role of hexamethylenetetramine in ZnO-cellulose nanocomposite enabled UV and humidity sensor", *Materials Science in Semiconductor Processing*, **105,** 104699 (2020).

2. **Karunakar Sahoo,** Biswajyoti Mohanty and Jhasaketan Nayak, "Enhanced photoresponse characteristics of ZnO polymer nanocomposite: effect of variation of surface density of nanocrystals", *Journal of Materials Science: Materials in Electronics*, **30,** 19664–19674 (2019).

3. Biswajyoti Mohanty**, Karunakar Sahoo** and Jhasaketan Nayak, "A two-step hydrothermal synthesis of CeO_2/CdS nanocomposite for photovoltaic application: an investigation on surface morphology, structure, optical and electrical properties", *Material Research Express,* **6,** 0950c5 (2019).

4. **Karunakar Sahoo,** Amrita Biswas and Jhasaketan Nayak, "Effect of synthesis temperature on the UV sensing properties of ZnO-cellulose nanocomposite powder ", *Sensors and Actuators A: Physical,* **267,** 99–105 (2017).

II. Proceedings:

1. **Karunakar Sahoo,** Biswajyoti Mohanty and Jhasaketan Nayak, "Study of ultraviolet sensing properties of ZnO nanoparticles grown on cellulose fibers", *Materials Today: Proceedings,* **18,** 1156–1161 (2019).

2. **Karunakar Sahoo** and Jhasaketan Nayak, "Effect of surfactant concentration on the ultraviolet sensing properties of ZnO-cellulose nanocomposites", *AIP Conference Proceedings,* **1953,** 030104 (2018).

3. **Karunakar Sahoo** and Jhasaketan Nayak, "ZnO-cellulose nanocomposite powder for application in UV sensors", *AIP Conference Proceedings,* **1832,** 050090 (2017).

Conferences/Seminar Presentations

2017 Oral presentation in International Conference "*ICN:3I-2017*" with paper titled "Study of ultraviolet sensing properties of ZnO nanoparticles grown on cellulose fibers", 6th to 8th December 2017, IIT Roorkee, India.

Poster presentation in International Conference "*ICC 2017*" with paper titled "Effect of surfactant concentration on the ultraviolet sensing properties of ZnO-cellulose nanocomposites", 24th to 25th November 2017, Govt. Engineering College, Bikaner.

2016 Poster presentation in International Conference "*61st DAE- SSPS 2016*" with paper titled "ZnO-cellulose nanocomposite powder for application in UV sensors", 26th to 30th December 2016, KIIT University, Bhubaneswar, India.

Poster presentation in International Conference "*ICFM 2016*" on "Synthesis of ZnO-cellulose nanocomposite for high UV photoconductivity sensor", 12th to 14th December 2016, IIT Kharagpur.

2015 Participated in "*One day workshop on Advanced Characterization Techniques*" during *7th National Symposium for Materials Research Scholars, MR-15* held at IIT Bombay on 20th May 2015.

Academic Awards/Fellowships

Two years of JRF and three years of SRF awarded by MHRD, Govt. of India from August 2014 to August 2019.

Qualified Graduate Aptitude Test in Engineering (GATE) (Physics) 2014 and 2015.

Research Experience and Skills

- **Chemical synthesis**: Metal oxide nanostructures, Metal oxide-polymer nanocomposites.
- **Nanocomposite synthesis**: Aqueous chemical bath deposition method.
- **Thin film preparation**: Spin coating, Hydrothermal.
- **Device fabrication**: UV sensor, Humidity sensor.
- **Characterization techniques**: Scanning Electron Microscopy, Transmission Electron Microscopy, X-ray Diffraction Spectroscopy, Energy Dispersive X-ray Spectroscopy, UV-Vis Diffuse Reflectance Spectroscopy, BET surface area analysis, Thermogravimetric analysis, Current-voltage measurement, Time-resolved photocurrent measurement and Humidity sensing properties measurement.
- **Data Analysis**: Origin (plotting and fitting), X-Pert Highscore (XRD pattern analysis), Image J (image processing).

Instrument Handled

Proficient in the experimental equipment and interpretation of data from techniques like

- **Sample preparation**: Sonicator, Centrifuge, Spin Coater and Hydraulic Press.
- **Morphological study**: Field Emission Scanning Electron Microscope (FESEM).
- **Structural study**: X-ray powder Diffractometer.
- **Optical study**: UV-VIS Spectrophotometer.
- **Surface area study**: BET surface area analyzer.
- **Thermal study**: Thermogravimetric analyzer (TGA).
- **Electrical study**: Source meter unit, Electrochemical Workstation and Digital LCR meter.

Current research interest

- Synthesis of metal oxide nanostructures and metal oxide-polymer nanocomposites.
- Morphology, electrical properties of materials and its device applications.
- UV, humidity, gas and chemical sensing applications.

Teaching Experience

Have been involved in teaching assistance (TA) job at IIT (ISM) Dhanbad for B.Tech (Physics Experiment Lab) and M.Sc courses (Physics Lab), August 2014 - July 2018.

Have worked as guest faculty in Physics at J.K.B.K Govt. College, Cuttack (August 2011 - February 2012 and August 2012 - February 2013).

Personal Details

Name:	Karunakar Sahoo
Date of Birth:	13th April 1987
Father's Name:	Sambhunath Sahoo
Mother's Name:	Padmabati Sahoo
Gender:	Male
Marital Status:	Married
Spouse's Name:	Anita Giri
Category:	General
Nationality:	Indian
Permanent Address:	At - Kalarui, Po - Pancharukhi. Via - Baliapal, Dist - Balasore, Pin - 756026, State - Odisha, India.
Languages Known:	English, Hindi and Odia (native speaker)
Hobbies:	Scientific reading, Cooking, Cycling and Playing cricket

References

1. Dr. Jhasaketan Nayak
   Assistant Professor,
   Department of Physics,
   Indian Institute of Technology (ISM) Dhanbad,
   Dhanbad - 826004, India.
   E-mail: nayakj@iitism.ac.in
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2. Dr. Bhabyadarsan Sahoo
   Scientific officer E,
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   Phone +91- 9619679783

Declaration: I hereby declare that all the above written particulars are correct to the best of my knowledge and belief. And any further information required will be provided.

Place: Balasore, Odisha, India **Karunakar Sahoo**