

Name: Mr. Subhranshu Sekhar Samal

Designation: Scientist-C

Present Institution: Centre for Nanoscience & Nanotechnology

(A Joint Initiative of Indira Gandhi Centre for Atomic Research & Sathyabama University)

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**Brief account of your research interests with special focus on Nano Science and Technology (strictly within 300 words):**

My research area includes synthesis of Multiwalled Carbon nanotubes by CVD method and preparation of polymer based nanocomposites from multiwalled carbon nanotubes.

Polymer based CNT based composites have been done using different methods and mechanical, electrical and morphological characterizations have soon enhanced and remarkable changes as compared to neat polymer samples.

Now establishing a new method for low temperature synthesis of aligned CNTs by ECR plasma method in collaboration with IGCAR, kalpakkam for gas sensing applications

I have started working on antimicrobial effects of carbon nanotubes synthesized from carbon soots which is rich in carbon nanostructures.

**Key Words: CVD/CarbonNanotubes/Polymer/Nanocomposites/ECR/Antimicrobial**

## Research experience in field of nanotechnology :

- 1. I was working as Project Associate in the DST sponsored project “Fabrication and Characterization of polymer Nanocomposites” from October’06 to July’07 in Department of Metallurgical and Materials Engineering, NIT, Rourkela.**
- 2. I was working as Junior ARCI fellow in Centre for Carbon Nanotubes, International Advanced Research Centre for Powder Metallurgy and New Materials, Hyderabad (Dept. of Science and Technology) from 10<sup>th</sup> August’07 to 21 Sept’07 in the project entitled ‘Synthesis, Optimization & Characterisation of MWCNTS by CVD’.**
- 3. I am currently working as Scientist-C in Centre for Nanoscience & Nanotechnology (A joint initiative of IGCAR, Kalpakkam & Sathyabama Deemed University, Chennai) till date**

## Investigator:

*Project: Synthesis of Carbon Nanotubes for Gas Sensing Application Funded by Indira Gandhi centre for Atomic Research (IGCAR, Kalpakkam), Department of Atomic Energy, India*

### Academic Profile:

| Degrees   | Year of Passing  | Board/ University  | Subjects   | DIVISION     |
|---|------------------|--|--|--------------|
| <b>High School Certificate Examination</b>                              | <b>1998</b>      | <b>Board of Secondary Education, Orissa</b>                          | <b>Oriya,English, Mathematics, Science,Social Science,Hindi</b>    | <b>FIRST</b> |
| <b>Higher Secondary Examination (10+2) Science</b>                      | <b>2000</b>      | <b>Council of Higher Secondary Education, Orissa</b>                 | <b>Oriya,English, Physics,Chemistry, Mathematics, Electronics.</b> | <b>FIRST</b> |
| <b>B.Sc. (Physics) Honours</b>  | <b>2003</b>      | <b>Stewart Science College (Utkal University), Orissa</b>            | <b>Physics(Hons) Chemistry, Mathematics, Eelectronics</b>          | <b>FIRST</b> |
| <b>M.Sc. Physics (Material Science)</b>                                 | <b>2004-2006</b> | <b>N.I.T, Rourkela (Deemed University)</b>                           | <b>Physics</b>   | <b>FIRST</b> |
| <b>Ph.D (Metallurgical&amp; Materials Engineering) -2006 Continuing</b> | <b>2006</b>      | <b>National Institute of Technology(Deemed University), Rourkela</b> | <b>Carbon Nanotube Reinforced Polymer Composites</b>               | <b>.</b>     |

### Area of interests:

- **Carbon Nanotube based Polymer Composites**
- **Composites Materials**
- **Carbon Materials**

- **Nanomaterials**
- **Material Science and Material Characterisation** □
- **Synthesis of Carbon Nanotubes by CVD method**
- **Surface Engineering & Electron Beam Thin film coatings**

## Projects & Training

### Summer Research Fellowship

**Location:** *Institute for Plasma Research, Bhat, Gandhinagar, Gujarat*

**Project Title:** “Fabrication and calibration of a 3 axis magnetic probe for measurement of magnetic field in X, Y and Z direction using Hall sensors (HAL-402)”

**Period:** 01.06.05 to 15.07.05

**Project Supervisors:**

Dr. Amit Sircar, SST operation Group, IPR, Gandhinagar

&

Mr. C.J Hansalia, Electronics Group, IPR, Gandhinagar.

### M.sc. Project

**Location:** *Department of Metallurgical & Materials Engineering, N.I.T, Rourkela, Orissa*

**Project Title:** “Synthesis and characterization of Carbon Nanotube/Epoxy composite”

**Period:** Dec’05 to April’06

Project Supervisors: Dr. Smrutisikha Bal

## Journal Publications

- **Carbon Nanotube Reinforced Composites – A state of the art:** S S Samal & S Bal, *Bull. Mater. Sci.*, Vol. 30, No. 4, August 2007, pp. 379–386.
- **Effect of Mechanical Properties on Fracture Surfaces of Carbon Nanotube Composites Pre-treated at Different Temperatures-** 'Effect of mechanical properties on fracture surfaces of carbon nanotube composites pre-treated at different temperatures': S. Bal, S.S Samal and U.K.Mohanty, *NICE Journal of Emerging Technologies*, ISSN No.: 0973-2993, vol-3, no.1, June 2008.
- **Carbon Nanotube reinforced Ceramic Matrix Composites: A review-** Subhanshu Sekhar Samal & S. Bal- *Journal of Minerals & Materials Characterization & Engineering*, Vol. 7, No.4, pp 355-370, 2008
- **Fracture analysis and morphological characterisation of Alligned and randomly oriented CNT based polymer composites.-** S S Samal & S Bal is Accepted in International Journal of Nanosystems to be appeared in Dec'2008 Issue.
- **Micro Structural Investigation of Fracture Surfaces to Study the Effect of Temperature on Mechanical Properties of Carbon Nanotube Composites-** S S Samal & S Bal (Communicated to *JMMCE*, USA under review)

## Conferences publications:

International Conferences:

1. *Polymer Based CNT Composites*- S.S Samal & S.Bal, Indo-Australian symposium of Nanoscience and Nanotechnology, IISc Bangalore , 31 march-01 april'2006.
2. *Nanotube dispersion in nanotube composites*- S.Bal & S.S Samal, Self-assembly Routes for Nanotech Materials (SARNaM-06), BARC, Mumbai, 26-28 April 2006.
3. *Polymer Carbon Nanocomposites-A big leap in material science* – S. Bal & S.S Samal, International Conference on Nanotechnology- Materials and Methods, CIT, Coimbatore, Tamilnadu, 23rd - 25th June 2006.
4. *Effect of dispersion on nanotube composites* – S. Bal & S.S Samal-International Conference on Nanotechnology – Materials and Methods, CIT, Coimbatore, Tamilnadu, 23rd – 25th June 2006.
5. *Carbon Nanotube Reinforced Polymer Composite* – S.Bal & S.S Samal, , Eighth International Conference on Nanostructured Materials (Nano 2006), Department of Metallurgy, IISc, Bangalore-560012 , August 20-25 2006.
6. *Delivery Of Therapeutic Molecules By Carbon Nanotubes*- Subhranshu Sekhar Samal, Bighnaraj Mishra and Amrita Jagdev, Eighth International Conference on Nanostructured Materials (Nano 2006), Department of Metallurgy, IISc, Bangalore-560012 , August 20-25 2006.

7. *Synthesis and Characterization of Carbon Nanotube Reinforced Epoxy Composite-* Smrutisikha Bal & Subhranshu Sekhar Samal, ICNME. CMET Pune.
8. *Role of Dispersion for Enhancement of Mechanical and Electrical Parameters of Multiwalled Carbon Nanotube Reinforced Epoxy composites-* Subhranshu S. Samal, S Bal, & U.K Mohanty. ICAMC- 2007, RRL Trivendrum.
9. *Effect of process parameters on the mechanical & electrical properties of the multiwalled carbon nanotube based polymer composites post cured at different environmental conditions-* Subhranshu S. Samal & S Bal, ICONSAT-2008 (Feb.17-29).
10. *Effect of Temperature on Mechanical & Micro Structural Properties of Fracture Surfaces of Carbon Nanotube Reinforced Polymer Composites-* Subhranshu S. Samal & S Bal, Bangalore Nano-2007 (Dec 6-7).
11. *Carbon Nanotube Reinforced Ceramic Matrix Composites-* S S Samal & S Bal , International Workshop on Microscopic, Nanoscopic and Mesoscopic Materials( IWMnMM-2008)
12. *Effect of Process Parameters on The Mechanical & Electrical Properties of The Multiwalled Carbon Nanotube Based Polymer Composites Treated at Different Conditions-* Subhranshu S. Samal & S Bal, IndoSwiss Bonding (2008), International symposium on Bonding & Adhesions (Feb 14-16).

### National Conferences:

1. *Polymeric Nanocomposites :An advanced material-* S. Bal and S.S Samal, Recent Advances in Physics, Dalmia college, Rajgangpur Feb. 4-5, 2006.

**2. *Influence of Dispersion States of Carbon Nanotubes on Mechanical Properties of Epoxy Nanocomposites* – S. Bal and S.S. Samal, Recent Trends in Mechatronics Nanotechnology and Robotics April' 14 2006.**

**3. *Single Walled Carbon Nanotube For Hydrogen Storage* – A review, S.S.Samal and B. Mishra, Recent Trends in Mechatronics Nanotechnology and Robotics, RTMNR 2006, 15-16 Apr-2006.**

**4. *Sonicated low volume fraction Carbon Nanotube Reinforced Epoxy nanocomposites and the role of dispersion on its mechanical properties* -Smrutisikha Bal & Subhranshu Sekhar Samal, National Review and coordination meeting on Nanoscience and Nanotechnology, ARCI Hyderabad -feb'21-23'2007.**

**Papers presented in national level technical symposia:**

- 1. “Photo transistor - A Review” in the National level technical symposium and it is published in the proceeding of the symposium (2004).**
- 2. “Waste Management-The Realistic Overview” in the National seminar on Solid waste management & is published in the proceeding organized by NIT Rourkela & Youth Movement Federation of India (2005).**
- 3. “Safe management of chemical & hazardous waste by plasma pyrolysis technology” in the international technical symposium organized by St. Peter’s Engineering College, Chennai (2005).**
- 4. National seminar in waste management in chemical & allied industries (WMCI) organized by NIT Rourkela (2005).**
- 5. “Pyrolysis – A big leap in waste Remediation” in Students chemical Engineering congress (SCHEMCON)-2005 organized by IICHE & IIT Guwahati.**

6. **“Application of Nano Technology in Heterogeneous catalysis” in SCHMCON-2005 organized by IICHE & IIT, Guwahati.**
7. **“Green chemistry –the obvious Answer” in National seminar on Environmental management for sustainable development in Indian Context (2006).**
8. **“Transition to sustainable industries- the role of metals” in National seminar on Environmental management for sustainable development in Indian context (2006).**
9. **“Plasma diagnostic using HALL sensor ICs in SST-1 TOKAMAK” in the national level technical symposium confluence 2k6 organized by N.I.T Rourkela and secured first position.**
10. **“Shape memory alloy” in the ceramic engineering department in confluence 2k6 of N.I.T Rourkela and secured second prize.**
11. **“Spintronics- a new revolution” in the technical festival organized by N.I.T Rourkela (2006).**
12. **“Plasma for healthy Environment” in Minerva 2k6 in the technical festival organized by mining Engineering Department of N.I.T Rourkela.**

#### Awards and achievements:

1. I have presented a paper entitled **“ Plasma diagnostic using HALL sensor ICs in SST-1 TOKAMAK” in the national level technical symposium confluence 2k6 organized by N.I.T Rourkela and secured first position .**
2. I have presented a paper entitled **“Shape memory alloy” in the ceramic engineering department in confluence 2k6 of N.I.T Rourkela and secured second prize.**

**3. I have presented one paper entitled “Plasma for healthy Environment” in Minerva 2k6 in the technical festival organized by mining Engineering Department of N.I.T Rourkela & secured second position.**

**4. I got the Vandana Chodhury Memorial Award 2002 from Stewart Sc. College, Cuttack for securing highest percentage marks in Physics Honours.**

**5. Invited as a speaker in International conference on Bonding & Adhesion (IndoSwiss Bonding 2008) held in MIT, Chennai**

**Membership:**

- **Student member of Plasma Science Society of India (PSSI) -Membership No SM-11.**
- **Reviewer of Journal of Manufacturing Engineering (Society of Manufacturing Engineers).**

**Technical skill/computer skill:**

**Knowledge of C**

**Well versed with XP window based system and Windows 98.**

**Knowledge in MS Office, origin, Microsoft works.**

**Personal details:**

**Subhranshu Sekhar Samal**

**Date of Birth: 19<sup>th</sup> August 1983**

**Father’s Name: Mr. Hrusikesh Samal**

**Permanent Address:**

**S/O-Hrusikesh Samal**

**At- Berhampur, Po- Meduakul, Via-Bari, Dist-Jajpur, Orissa, Pin-755003, India**