

## Dr. Ramkrishna Sahoo

DST INSPIRE FACULTY  
Centre for Nanomaterials  
International Advanced Research Centre  
for Powder Metallurgy and New Materials (ARCI),  
Balapur, Hyderabad, 500005

ORCID ID: 0000-0002-2551-6957  
Scopus Author ID: 57105900600



### Contact Information:

Email: [sahooramkrishna2010@gmail.com](mailto:sahooramkrishna2010@gmail.com)  
[ramkrishna.s@project.arci.res.in](mailto:ramkrishna.s@project.arci.res.in)

Landline: +91-40-24452583

Mobile: +91-8900695358

### Professional Background

December 2019 –to– Ongoing	<b>DST INSPIRE Faculty</b> at International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), Balapur, Hyderabad, Research Area
October 2018 –to– November 2019	<b>DST INSPIRE Faculty</b> at Centre for Advanced Studies, AKTU, Lucknow
March 2017 –to– September 2018	<b>Postdoctoral Researcher</b> at IBS Centre, CINAP, Sungkyunkwan University, South Korea

### Education

2012 –to– 2016	<b>Doctor of Philosophy (Ph.D.) in Chemistry</b> , Indian Institute of Technology, Kharagpur, India; <b>Thesis title:</b> <i>Synthesis of Transition Metal Oxo-/Hydroxo- Nanomaterials for Environmental Remediation and Energy Storage Application.</i>
2009 –to– 2011	<b>Master of Science (M.Sc)</b> in Chemistry, West Bengal State University, Barasat, India
2006 –to– 2009	<b>Bachelor of Science (B.Sc.)</b> in Chemistry, University of Calcutta, Kolkata, India

### Awards and Achievements

- **Nominated by USERN for USERN Prize 2019.**
- Selected for **INSPIRE Faculty Award-2018** (Session-I) under the AORC Scheme of DST.
- Selected for the **SERB Indo-U.S. Postdoctoral Fellowship**, Science and Engineering Research Board (SERB) and Indo-U.S. Science and Technology Forum (IUSSTF) at **University of Texas, Texas**, August 2017-*denied the offer.*
- **CSIR-NET**, Govt. of India (All India Rank-60), December 2011.
- **GATE**, Govt. of India (All India Rank -180), February 2012.

### R & D Project

Title	Amount (years)	Funding agency
Transition metal dichalcogenides (TMDs) nanostructure; a better alternative for Li-ion and Na-ion battery anode	35 Lakhs (5 years)	DST, Govt. of India

## Research Experiences

---

- Wet chemical synthesis of different single and mixed transition metal oxides (TMOs)/hydroxides (TMHs).
- Designing of new synthetic strategy for the synthesis of nanomaterial with different morphology.
- Development of positive electrode and negative electrode for asymmetric supercapacitor and hybrid battery supercapacitor device
- Development of new strategies for widening the working voltage of asymmetric supercapacitor in aqueous electrolyte
- Development of new materials for Li-ion and Na-ion battery anode.

## Research Interests

---

- Development of electrode material for Li-ion and Na-ion battery and capacitor for commercial use.
- Development of large-scale synthesis of electrode materials for Li-ion and Na-ion battery.
- Optimization of cathodic and anodic performance in Li and Na-ion full cell battery.

## Research Skills

---

- Synthesis of nanomaterials with several unique morphologies using hydrothermal techniques, microwave techniques, CVD, etc.
- Analysis of different physical methods: FESEM, EDX, TEM, HRTEM, SAED, STEM, AFM, powdered XRD, XPS, FTIR, UV-vis spectra, fluorescence spectra, DRS, FTIR spectra, BET, TGA.
- Good work experience with the instruments such as electrochemical workstation (CHI 660 E, Bio-logic), Fluorometer (Thermo Fisher), Spectrophotometer (Thermo Fisher), FESEM (FEI NOVA NANOSEM 450), Powdered XRD (SmartLab), BET.
- Li/Na-ion cell fabrication in dry room/glove box (coin cell, solid state supercapacitor etc.)

## Publications

---

### Journals:

### First Author:

1. **Sahoo, R.;** Lee T. H.; Pham, D. T.; Luu T. H. and Lee, Y. H. Fast-Charging High-Energy Battery–Supercapacitor Hybrid: Anodic Reduced Graphene Oxide–Vanadium(IV) Oxide Sheet-on-Sheet Heterostructure. *ACS Nano* 2019, *13*, 9, 10776-10786. **(I. F.- 13.9)**
2. **Sahoo, R.;** Pham, D. T.; Lee T. H.; Seok J.; Luu T. H. and Lee, Y. H. Redox-Driven Route for Widening Voltage Window in Asymmetric Supercapacitor. *ACS Nano* 2018, *12*, 8494-8505. **(I. F.- 13.9)**
3. **Sahoo, R.;** Acharyya, P.; Sing, N. K.; Pal, A.; Negishi, Y. and Pal, T. Advance Aqueous Asymmetric Supercapacitor Based on Large 2D NiCo<sub>2</sub>O<sub>4</sub> Nanostructures and the rGO@Fe<sub>3</sub>O<sub>4</sub> Composite. *ACS Omega* 2017, *2*, 6576–6585. **(I. F.- 2.584)**
4. **Sahoo, R.;** Pal, A. and Pal, T. Proportion of Composition in a Composite does Matter to Behave as an Advanced Supercapacitor. *J. Mater. Chem. A* 2016, *4*, 17440-17454. **(I. F.- 10.733)**
5. **Sahoo, R.;** Pal, A. and Pal, T. 2D Materials for Renewable Energy Storage Devices: Outlook and Challenges. *Chem. Commun.* 2016, *52*, 13528-13542. **(I. F.- 6.290)**
6. **Sahoo, R.;** Sasmal, A. K.; Ray, C.; Dutta, S.; Pal, A. and Pal, T. Suitable Morphology Makes CoSn(OH)<sub>6</sub> Nanostructure a Superior Electrochemical Pseudocapacitor. *ACS Appl. Mater. Interfaces* 2016, *8*, 17987-17998. **(I. F.- 8.456)**
7. **Sahoo, R.;** Santra, S.; Ray, C.; Pal, A.; Negishi, Y.; Ray, S. K. and Pal, T. Hierarchical Growth of ZnFe<sub>2</sub>O<sub>4</sub> for Sensing Applications. *New J. Chem.* 2016, *40*, 1861-1871. **(I. F.- 3.201)**

8. **Sahoo, R.;** Roy, A.; Dutta, S.; Ray, C.; Aditya, T.; Pal, A. and Pal, T. Liquor Ammonia Mediated V(V) Insertion in Thin  $\text{Co}_3\text{O}_4$  Sheets for Improved Pseudocapacitors with High Energy Density and High Specific Capacitance Value. *Chem. Commun.* 2015, 51, 15986-15989. **(I. F.- 6.290)**
9. **Sahoo, R.;** Pradhan, M.; Roy, A.; Dutta, S.; Ray, C.; Negishi, Y.; Pal, A. and Pal, T. Redox-Mediated Synthesis of a  $\text{Fe}_3\text{O}_4\text{-MnO}_2$  Nanocomposite for Dye Adsorption and Pseudocapacitance. *Chem. Asian J.* 2015, 10, 1571-1580. **(I. F.- 3.692)**
10. **Sahoo, R.;** Dutta, S.; Pradhan, M.; Ray, C.; Roy, A. Pal, T and Pal. A. Arsenate Stabilized  $\text{Cu}_2\text{O}$  Nanoparticle Catalyst for One-Electron Transfer Reversible Reaction. *Dalton trans.* 2014, 43, 6677-6683. **(I. F.- 4.099)**
11. **Sahoo, R.;** Roy, A.; Ray, C.; Mondal, C.; Negishi, Y.; Yusuf, S. M.; Pal, A. and Pal, T. Decoration of  $\text{Fe}_3\text{O}_4$  Base Material with Pd Loaded CdS Nanoparticle for Superior Photocatalytic Efficiency. *J. Phys. Chem. C* 2014, 118, 11485-11494. **(I. F.- 4.309)**

**Co-Author:**

1. Roy, A.; **Sahoo, R.;** Ray, C.; Dutta, D. and Pal, T. Soft Template Induced Phase Selective Synthesis of  $\text{Fe}_2\text{O}_3$  Nanomagnets: One Step towards Peroxidase-mimic Activity Allowing Colorimetric Sensing of Thioglycolic Acid. *RSC. Adv.* 2016, 6, 32308-32318. **(I. F.- 2.936)**
2. Dutta, S.; **Sahoo, R.;** Ray, C.; Sarkar, S.; Jana, J.; Negishi, Y. and Pal, T. Biomolecule-Mediated CdS- $\text{TiO}_2$ -Reduced Graphene Oxide Ternary Nanocomposites for Efficient Visible Light-Driven Photocatalysis. *Dalton trans.* 2015, 44, 193-201. **(I. F.- 4.099)**
3. Roy, A.; **Sahoo, R.;** Chowdhury, J.; Bhattacharya, T. S.; Agarwal, R. and Pal, T. Directional Growth of Ag Nanorod from Polymeric Silver Cyanide: A Potential Substrate for Concentration Dependent SERS Signal Enhancement Leading to Melamine Detection. *Spectrochim. Acta Mol. Biomol. Spectrosc.* 2017, 183, 402-407. **(I. F.- 2.098)**
4. Lee T. H.; Pham, D. T.; **Sahoo, R.;** Seok J.; Luu T. H. and Lee, Y. H. High Energy Density and Enhanced Stability of Asymmetric Supercapacitors with Mesoporous  $\text{MnO}_2\text{@CNT}$  and Nanodot  $\text{MoO}_3\text{@CNT}$  Free-Standing Films. *Energy Storage Mater.* 2018, 12, 223-231.
5. Aditya, T.; Jana, J.; **Sahoo, R.;** Roy, A.; Pal, A. and Pal, T. Silver Molybdates with Intriguing Morphology and Peroxidase Mimic with High Sulfide Sensing Capacity. *Cryst. Growth Des.* 2017, 17, 295-307. **(I. F.- 4.153)**
6. Roy, A.; Debnath, B.; **Sahoo, R.;** Pal, T. Micelle Confined Mechanistic Pathway for 4-Nitrophenol Reduction. *J. Colloid. Interface Sci.* 2017, 493, 288-294. **(I. F.- 5.091)**
7. Sasmal, A. K.; Pal, J.; **Sahoo, R.;** Kartikeya, P.; Dutta, S. and Pal, T. Superb Dye Adsorption and Dye-Sensitized Change in  $\text{Cu}_2\text{O-Ag}$  Crystal Faces in the Dark. *J. Phys. Chem. C* 2016, 120, 21580-21588. **(I. F.- 4.309).**
8. Roy, A.; Debnath, B.; **Sahoo, R.;** Chandrakumar, K. S.; Ray, C.; Jana, J. and Pal, T. Enhanced Catalytic Activity of Ag/Rh Bimetallic Nanomaterial: Evidence of an Ensemble Effect. *J. Phys. Chem. C* 2016, 120, 5457-5467. **(I. F.- 4.309)**
9. Ray, C.; Dutta, S.; **Sahoo, R.;** Roy, A.; Negishi, Y. and Pal, T. Fabrication of Nitrogen-Doped Mesoporous-Carbon-Coated Palladium Nanoparticles: An Intriguing Electrocatalyst for Methanol and Formic Acid Oxidation. *Chem. Asian J.* 2016, 11, 1588-1596. **(I. F.- 3.692)**
10. Mondal, C.; Singh, A.; **Sahoo, R.;** Sasmal, A. K.; Negishi, Y. and Pal, T. Preformed ZnS Nanoflower Prompted Evolution of  $\text{CuS/ZnS}$  p-n Heterojunctions for Exceptional Visible-Light Driven Photocatalytic Activity. *New J. Chem.* 2015, 39, 5628-5635. **(I. F.- 3.201)**

11. Dutta, S.; Ray, C.; Roy, A.; **Sahoo, R.** and Pal, T. Metal Bromide Controlled Interfacial Aromatization Reaction for Shape-Selective Synthesis of Palladium Nanostructures with Efficient Catalytic Performances. *Chem. Eur. J.* 2016, 22, 10017-10027. **(I. F.- 5.16)**
12. Ray, C.; Dutta, S.; Roy, A.; **Sahoo, R.** and Pal, T. Redox Mediated Synthesis of Hierarchical Bi<sub>2</sub>O<sub>3</sub>/MnO<sub>2</sub> Nanoflowers: a Non-Enzymatic Hydrogen Peroxide Electrochemical Sensor. *Dalton trans.* 2016, 45, 4780-4790. **(I. F.- 4.099)**
13. Pradhan, M.; Roy, A.; Sinha, A. K.; **Sahoo, R.**; Deb, D. and Pal, T. Solid-state Transformation of Single Precursor Vanadium Complex Nanostructures to V<sub>2</sub>O<sub>5</sub> and VO<sub>2</sub>: Catalytic Activity of V<sub>2</sub>O<sub>5</sub> for Oxidative Coupling of 2-Naphthol. *Dalton trans.* 2015, 44, 1889-1899. **(I. F.- 4.099)**
14. Roy, A.; Pradhan, M.; Ray, C.; **Sahoo, R.**; Dutta, S. and Pal, T. Facile Synthesis of Pyridine Intercalated Ultra-long V<sub>2</sub>O<sub>5</sub> Nanowire from Commercial V<sub>2</sub>O<sub>5</sub>: Catalytic Applications in Selective Dye Degradation. *CrystEngComm* 2014, 16, 7738-7744. **(I. F.- 3.304)**
15. Pal, A.; Saha, S.; Maji, S. K.; **Sahoo, R.**; Kundu, M. and Kundu, A. Galvanic Replacement of As(0) Nanoparticles by Au(III) for Nanogold Fabrication and SERS Application. *New J. Chem.* 2014, 38, 1675-1683. **(I. F.- 3.277)**
16. Ray, C.; Dutta, S.; Sarkar, S.; **Sahoo, R.**; Roy, A. and Pal, T. Intrinsic Peroxidase-like Activity of Mesoporous Nickel Oxide for Selective Cysteine Sensing. *J. Mater. Chem. B* 2014, 2, 6097-6105. **(I. F.- 4.476)**
17. Mondal, C.; Ganguly, M.; Pal, J.; **Sahoo, R.**; Sinha, A. K. and Pal, T. Pure Inorganic Gel: a New Host with Tremendous Sorption Capability. *Chem. Commun.* 2013, 49, 9428-9430. **(I. F.- 6.164)**
18. Ray, C., Dutta, S.; Sarkar, S.; **Sahoo, R.**; Roy, A. and Pal, T. A Facile Synthesis of 1D Nano Structured Selenium and Au Decorated Nano Selenium: Catalysts for the Clock Reaction. *RSC Adv.* 2013, 3, 24313-24320. **(I. F.- 2.936)**
19. Dutta, S.; Ray, C.; Sarkar, S.; Roy, A., **Sahoo, R.** and Pal, T. Facile Synthesis of Bimetallic Au-Pt, Pd-Pt, and Au-Pd Nanostructures: Enhanced Catalytic Performance of Pd-Pt Analogue towards Fuel Cell Application and Electrochemical Sensing. *Electrochimica Acta* 2015, 180, 1075-1084. **(I. F.- 5.116)**
20. Ray, C., Sarkar, S.; Dutta, S.; Roy, A.; **Sahoo, R.**; Negishi, Y. and Pal, T. Evolution of Tubular Copper Sulfide Nanostructures from Copper(I)-Metal Organic Precursor: a Superior Platform for the Removal of Hg(II) and Pb(II) Ions. *RSC Adv.* 2015, 5, 12446-12453. **(I. F.- 2.936)**
21. Dutta, S.; Ray, C.; Mallick, S.; Sarkar, S.; **Sahoo, R.**; Negishi, Y. and Pal, T. A Gel-Based Approach To Design Hierarchical CuS Decorated Reduced Graphene Oxide Nanosheets for Enhanced Peroxidase-like Activity Leading to Colorimetric Detection of Dopamine. *J. Phys. Chem. C* 2015, 119, 23790-23800. **(I. F.- 4.484)**
22. Dutta, S.; Sarkar, S.; Ray, C.; Roy, A. **Sahoo, R.** Pal, T. Mesoporous Gold and Palladium Nanoleaves from Liquid-Liquid Interface: Enhanced Catalytic Activity of the Palladium Analogue toward Hydrazine-Assisted Room-Temperature 4-Nitrophenol Reduction. *ACS appl. Mater. & interfaces* 2014, 6, 9134-9143. **(I. F.- 8.097)**
23. Mondal, C.; Ganguly, M.; Sinha, A.K.; Pal, J.; **Sahoo, R.** and Pal, T. Robust Cubooctahedron Zn<sub>3</sub>V<sub>2</sub>O<sub>8</sub> in Gram Quantity: a Material for Photocatalytic Dye Degradation in Water. *CrystEngComm* 2013, 15, 6745-6751. **(I. F.- 3.304)**

### Citation Metrics (based on Google Scholar)

---

Total Citation – 825

h-index – 18

i10 – index – 28

## Academic Actives

---

3. Mentor, two M.Sc. students in the laboratory, IIT Kharagpur for one year project.
4. Mentor one Ph.D. student, Sungkyunkwan University, South Korea.
5. Mentor three M.Tech. Students, Centre for Advanced Studies, AKTU for their minor project thesis.
6. Supervised one Project assistant for one year at Centre for Advanced Studies, AKTU.

## Teaching Actives

---

1. **DST Inspire Faculty**, at Centre for Advanced Studies (1 year and 2 months)

Course	Course Code
<b>Core Course</b>	
• Introduction to Nanotechnology	NST 103
• Overview of Advanced Micro & Nano-material Characterization Techniques	NST 201
• Applied Chemistry: Bio and Materials Chemistry	
• Energy Conversion and Storage System	NST102
	EST 103
<b>Elective Course</b>	
• Nanotechnology for Environmental Applications	NSTE2 206

2. **Guest Lecturer**, Ananda Mohan College, Kolkata for UG teaching (from September 2011 to April 2012).
3. Teaching Assistant, IIT Kharagpur (from July, 2012-May-2015)

## Member

---

**ECS:** Member (ID: 423133)

**IEEE:** Associate member (ID: 95582827)

## Volunteer Service

---

As a peer reviewer;

**Carbon (ELSEVIER):** Since December 2016

**Energy Storage Materials (ELSEVIER):** Since November 2017

**Catalysis Today (ELSVIER):** Since June 2019

**Applied Surface Science (ELSVIER):** Since September 2019

## Presentations

---

1. Poster Presentation on 'Redox Guided Synthesis of Fe<sub>3</sub>O<sub>4</sub>-MnO<sub>2</sub> Composite as Electrochemical Pseudocapacitor', RTFMNN, Kolkata, India, February 04-05, 2016.
2. Oral Presentation on 'Fabrication of Cobalt Oxide Based Pseudocapacitor with High Energy Density and High Specific Capacitance Value', NANO-15, Tiruchigide, India, December 07-10, 2015.
3. Poster Presentation on 'Submerged Iron Nanoparticle for Evolution of Fe<sub>3</sub>O<sub>4</sub> Based Photoactive and Adsorbent Materials', NANODAYS 2015, Kolkata, February 16-18, 2015.
4. Attend 'ACS on Campus event' at IIT Kharagpur, India, November 2013.
5. Attend 'Modern trend of Chemistry in the 21<sup>st</sup> Century', Kolkata, India, February 06-07, 2012.