

Curriculum Vitae

Prabhakar Rai (Ph.D)
Scientist-B
Wildlife Section
Zoological Survey of India
Ministry of Environment, Forest, and Climate Change
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EDUCATIONAL QUALIFICATION

- ✧ **Ph.D.** (Materials Engineering) **2012**
Chonbuk National University, South Korea
 - ✧ **M. Sc.** (Inorganic Chemistry) **2006**
University of Allahabad, India
 - ✧ **B. Sc.** (Chemistry, Botany and Zoology) **2002**
D.D.U. Gorakhpur University, India
- Other Educational Qualification**
- ✧ **NET** (Chemical Science) **2016**
CSIR/UGC, India
 - ✧ **TOEIC** (English) **2010**
Educational Testing Service, USA

RESEARCH/ TEACHING EXPERIENCE

- ✧ **Scientist-B** 11/2018-till date
Zoological Survey of India, India
- ✧ **INSPIRE Faculty** 12/2014-11/2018
IIT Kanpur, India
- ✧ **Visiting Researcher** 05/2018-07/2018
University of Rovira i Virgili, Spain
- ✧ **Research Professor** 10/2013-08/2014
Korea University, South Korea
- ✧ **Assistant Research Professor** 10/2012-09/2013
Chonbuk National University, South Korea
- ✧ **Adjunct Assistant Professor** 03/2012-09/2012
Chonbuk National University, South Korea

RESEARCH INTERESTS

- Chemical sensor technology- Hard-soft acid-base (HSAB) concept for selectivity improvement of metal oxides semiconductor based gas/bio-sensor.
- Photovoltaic cell- Application of localized surface Plasmon resonance to enhance the light harvesting capability of photoanodes.
- Electrochemical energy storage device- Role of grain boundaries on electrical conductivity and subsequent effect on electrochemical properties.
- Environmental impact assessment- Impact of anthropogenic factors on ecology.

AWARDS AND RECOGNITIONS

- *SERB-International Travel Support Grant (2017)* to visit USA for 253rd ACS Meeting and Exposition.
- *CSIR/UGC National Eligibility Test (NET) for Lectureship (2016)* conducted by Council of Scientific and Industrial Research (CSIR), India (**All India 19th Rank**)
- *Young Scientist Award (2015)*, International Academy of Physical Sciences, India.
- *DST-INSPIRE Faculty Award (2014)*, Department of Science and Technology, Government of India
- *University Grant Fellowship (2013)*, Korea University, South Korea
- *University Grant Fellowship (2012)*, Chonbuk National University, South Korea

- *Post-Doctoral Fellowship (2012)*, University of Rome, Italy
- *Certificate of Outstanding Contribution in Reviewing (2015)*, Sensors and Actuators B: Chemical, ELSIVIER
- *National Advisory Committee member*, 3rd International Conference on Soft Materials (ICSM 2018), 9-14 December 2018, Jaipur, India

LIST OF PROJECTS

- Environmental Impact Study on Ichthyo fauna of River Barak (2020-2023), supported by *Zoological Survey of India*, India. **PI**
- Biodiversity assessment and impact management plan for construction of bridge across Ganga between Sultanganj (Bhagalpur District) and Aguwani Ghat (Khagaria District) in Bihar (2019-2020), supported by *Bihar Rajya Pool Nirman Nigam Limited (BRPNNL)*, India. **Co-PI**
- Faunal Diversity of River Ganga (2017-2020), supported by *Zoological Survey of India*, India. **Co-PI**
- Electrophoretic deposition of nanostructured metal oxide semiconductors for gas sensor applications (2014-2019), supported by *Department of Science and Technology*, Government of India. **PI**
- Development of responsive nanostructured materials for high performance gas sensor applications (2013.10-2014.08), supported by *Korea University*, South Korea. **PI**
- Development of highly sensitive and selective gas sensing materials using metal@metal oxide core-shell nanoparticles (2012.10-2013.09), supported by *Chonbuk National University*, South Korea. **PI**

LIST OF PUBLICATIONS

h-index- 25

(Google Scholar)

*Corresponding Author

Selected Refereed Journal Articles

1. **Prabhakar Rai***, Praveen Kumar Sekhar, Chapter 1. Science and Technology of Metal Oxide Semiconductor Gas Sensor, 'Emerging Materials for Environment Protection and Renewable Energy', Nova Science Publishers. (ISBN: 978-1-53613-851-1) **(Book chapter)**
2. **Prabhakar Rai***, Plasmonic noble metal@metal oxide core-shell nanoparticles for dye-sensitized solar cell applications, *Sustainable Energy & Fuels (Royal Society of Chemistry)* 3 (1), 63–91, 1 January 2019. **(Review) (IF=5.503)**
3. **Prabhakar Rai***, Sanjit Manohar Majhi, Yeon-Tae Yu, Jong-Heun Lee, Noble metal@metal oxide semiconductors core@shell nanoarchitectures as a new platform for gas sensor applications. *RSC Advances (Royal Society of Chemistry)* 5 (93), 76229-76248, September 2015. **(Review) (IF= 3.119)**
4. **Prabhakar Rai***, Ji-Wook Yoon, Chang Hoon Kwak, Jong-Heun Lee, Role of Pd nanoparticles in gas sensing behaviour of Pd@In₂O₃ yolk-shell nanoreactors, *Journal of Materials Chemistry A (Royal Society of Chemistry)* 4(1), 264–269, 7 January 2016. **(IF= 11.301)**
5. Rudra Kumar, **Prabhakar Rai***, Ashutosh Sharma, Free-standing NiV₂S₄ nanosheet arrays on 3D Ni framework via anion exchange reaction as a novel electrode for asymmetric supercapacitor applications, *Journal of Materials Chemistry A (Royal Society of Chemistry)*, 4 (44), 17512–17520, 28 November 2016. **(IF= 11.301)**
6. Rudra Kumar, **Prabhakar Rai***, Ashutosh Sharma, 3D Urchin-shaped Ni₃V₂O₈ hierarchical hollow nanosphere for high-performance asymmetric supercapacitor applications, *Journal of Materials Chemistry A (Royal Society of Chemistry)*, 4 (25), 9822–9831, 7 July, 2016. **(IF= 11.301)**
7. **Prabhakar Rai**, Rizwan Khan, Sudarsan Raj, Sanjit Manohar Majhi, Kyung-Kuen Park, Yeon-Tae Yu, In-Hwan Lee, Praveen Kumar Sekhar, Au@Cu₂O core-shell nanoparticles as chemiresistor for gas sensor applications; effect of potential barrier modulation on sensing performance, *Nanoscale (Royal Society of Chemistry)* 6, (1) 581-588, January 2014. **(IF =6.895)**
8. **Prabhakar Rai**, Ji-Wook Yoon, Hyun-Mook Jeong, Su-Jin Hwang, Chang-Hoon Kwak, Jong-Heun Lee, Design of highly sensitive and selective Au@NiO yolk-shell nanoreactors for gas sensing applications, *Nanoscale (Royal Society of Chemistry)* 6 (14), 8292-8299, July 2014. **(IF =6.895)**
9. **Prabhakar Rai**, Sudarsan Raj, Kyoung-Jun Ko, Kyung-Keun Park, Yeon-Tae Yu, Synthesis of flower-like ZnO microstructures for gas sensor applications, *Sensors and Actuators B (ELSEVIER)* 178, 107–112, 1 March 2013. **(IF=7.100)**

10. **Prabhakar Rai**, Woon-Ki Kwak, Yeon-Tae Yu, Solvothermal synthesis of ZnO nanostructures and their morphology dependent gas sensing properties, *ACS Applied Materials and Interfaces (American Chemical Society)* 5, (8) 3026–3032, May 2013. **(IF=8.758)**
11. **Prabhakar Rai**, Yeon-Tae Yu, Synthesis of floral assembly with single crystalline ZnO nanorods and its CO sensing property, *Sensors and Actuators B (ELSEVIER)*, 161, (1) 748–754, 3 January, 2012. **(IF=7.100)**
12. **Prabhakar Rai**, Yun-Su Kim, Hyeon-Min Song, Min-Kyung Song, Yeon-Tae Yu, The role of gold catalyst on the sensing behavior of ZnO nanorods for CO and NO₂ gases, *Sensors and Actuators B (ELSEVIER)* 165, (1) 133–142, April, 2012. **(IF=7.100)**
13. **Prabhakar Rai**, Yeon-Tae Yu, Citrate assisted hydrothermal synthesis of single crystalline ZnO nanoparticles for gas sensor application, *Sensors and Actuators B (ELSEVIER)* 173, 58–65, October, 2012. **(IF=7.100)**

CONFERENCE

A. Invited Talk

1. Core@Shell Nanostructures for Gas Sensor Applications, **Prabhakar Rai**, One-day Workshop on Soft Materials and Society (SMRS 2017), December 15, 2017, MNIT Jaipur, Jaipur, India
2. Free-standing Ni₃(VO₄)₂ Nanosheet Arrays on 3D Ni Framework for Supercapacitor Applications, **Prabhakar Rai**, Rudra Kumar, Ashutosh Sharma, International Conference on Nano for Energy and Water (NEW)-2017, February 21-24, 2017, University of Petroleum and Energy Studies, Dehradun, India.
3. Design of Noble Metal@Metal Oxide Yolk-Shell Nanoreactors for Gas Sensor Applications, **Prabhakar Rai**, International Conference on Materials Science & Technology 2016 (ICMTech 2016), March 1-4, 2016, Delhi University, Delhi, India.

B. International conference

4. Morphology tailored porous hollow Cu₂O nanospheres fabricated by Ostwald ripening for Li-ion battery applications, **Prabhakar Rai**, Shilpa, Ashutosh Sharma, 253rd ACS National Meeting and Exposition, American Chemical Society, April 02-6, 2017, California, USA.
5. Growth of NiV₂S₄ Nanosheet Arrays on Ni Foam for Asymmetric Supercapacitor Applications, **Prabhakar Rai**, Rudra Kumar and Ashutosh Sharma, *International Union of Materials Research Societies - International Conference of Young Researchers on Advanced Materials (IUMRAS-ICYRAM-2016)*, December 11-15, 2016, IISc Bangalore, India.
6. Design of Noble Metals@Metal Oxides Yolk-Shell Nanoreactors as Model Materials for Highly Sensitive and Selective Gas Sensor Applications, **Prabhakar Rai**, 18th International Conference of International Academy of Physical Sciences (CONIAPS XVIII) On Recent Trends in Physical Sciences, December 22-24, 2015, Organized by Faculty of Science, University of Allahabad, Allahabad, India. **(Young Scientist Award)**
- 1) Chemiresistive Au@NiO yolk-shell nanoreactors for high performance gas sensor applications, **Prabhakar Rai**, Ji-Wook Yoon, Hyun-Mook Jeong, Su-Jin Hwang, Chang-Hoon Kwak, Jong-Heun Lee, *International Conference on Nano Science, Nano Engineering and Applications (ICONSEA 2014)* 2014.06.26- 28, JNTU, Hyderabad, India. **(Best Oral Presentation Award)**
7. One pot assembly of palladium nanoparticles (Pd NPs) on to single crystalline ZnO nanorods for CO sensor, **Prabhakar Rai**, Hyeon Min Song, Yun-Su Kim, Min-Kyung Song, Yeon-Tae Yu, *International Conference on Nanoscience and Technology-(CONSAT – 2012)*, 2012.01.20-23, International Advanced Research Center for Powder Metallurgy and New Materials (ARCI), Hyderabad, India.
8. Hydrothermal Synthesis, Characterization and Optical Property of Single Crystal ZnO Nanorods. **Prabhakar Rai**, Suraj Kumar Tripathy, Nam-Hee Park, Yeon-Tae Yu, *International Conference on Transport and Optical Properties of Nanomaterials (ICTOPON-2009)*, 2009.01.5-8, University of Allahabad, India.

C. National conference

9. CTAB-assisted One-Pot Assembly of Gold nanoparticles onto Single Crystalline ZnO Nanorods for Chemical Sensor, **Prabhakar Rai**, Yun-Su Kim, Hyeon Min Song, Yeon-Tae Yu, *Korean Sensor Society 2011*, 2011.11.04, KAIST, Daejeon, Republic of Korea. **(Best Poster Presentation Award)**