

## CURRICULUM VITAE

### **Dr. Alfa Sharma**

Assistant Professor (Chemistry)  
Odisha University of Technology & Research  
*Editorial Board Member, BMC Chemistry*  
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### **EDUCATION**

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❖ **Indian Institute of Technology (IIT) Indore, Indore**

**PhD, Metallurgy Engineering and Materials Science**, 07/2015- 01/2021

Discipline of Metallurgy Engineering & Materials Science

**Dissertation: “Synthesis and Characterization of Binary and Ternary Metal Oxide Nanostructures for Gas and Humidity Sensing Applications.”**

Thesis Advisor: Dr. Parasharam M. Shirage

❖ **Pondicherry University (A Central University)**

**Master of Technology (M.Tech), Green Energy Technology**, May 2015,

9.28/10 (First Class with Distinction)

**Dissertation: “Defect Induced Ferromagnetism based Gas Sensing of Mn-doped Barium Titanate.”**

Thesis Advisor: Prof. Perumal Elumalai (Pondicherry University) and Prof. N. Venkataramani (Indian Institute of Technology Bombay)

❖ **Utkal University, Bhubaneswar, India**

**Master of Philosophy (M.Phil.), Chemistry**, Jan 2013, 72.25%

**Dissertation: “Microwave Assisted Synthesis of ZnO-Ag Nanocomposites and its Photocatalytic Dye Degradation Study.”**

Thesis Advisor: Dr. Bijayalaxmi Jena

❖ **Utkal University, Bhubaneswar, India**

**Master of Science (M.Sc.), Chemistry**, June 2011, 66%

### **WORK EXPERIENCE**

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- Working as Assistant Professor in Department of Chemistry, Odisha University of Technology & Research (Formerly Known as College of Engineering & Technology, Bhubaneswar)- **03/2021 onwards.**

## PUBLICATIONS

(No. of Publications: 18; Google scholar citations: 302; *h*-index: 10; *i10*-index: 10)

Google scholar Link: <https://scholar.google.co.in/citations?hl=en&user=MsTnevkAAAAJ>

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### Book Chapter (Published):

1. Effect of Morphology and Doping on the Photoelectrochemical Performance of Zinc Oxide, “Electrochemical Energy Conversion and Storage Systems for Future Sustainability: Technological Advancements”, A. Sharma, P. Sahoo, **A. Sharma\***, and S. Mohapatra, **CRC PRESS**, (2020), 251-288, ISBN hard: 978-1-77188-885-1. (\*- Corresponding author)

### Peer- Reviewed Journals (Published):

2. Role of Different Counter Electrodes on Performance of TiO<sub>2</sub> based dye-sensitized solar cell (DSSC) fabricated with dye extracted from Hibiscus Sabdariffa as Sensitizer, S. C. Yadav, **A. Sharma**, R.S. Devan, P.M. Shirage, **Optical Materials**, (2022), 124, 112066. (I.F-3.080)

3. Hierarchically Interconnected ZnO nanowires for low temperature operated reducing gas sensors: Experimental and DFT studies, P. Chikate, **A. Sharma**, S. Rondiya, R. Cross, N.Y. Dzade, P.M. Shirage, R.S. Devan, **New Journal of Chemistry**, (2021), 45, 1404-1414. (I.F- 3.591)

4. Impact of different morphologies of CoFe<sub>2</sub>O<sub>4</sub> nanoparticles for tuning of structural, optical and magnetic properties, Y. Kumar, **A. Sharma**, P.M. Shirage, **Journal of Alloys and Compounds**, (2019), 778, 398-409. (I.F- 5.316)

5. Controlled Zn<sub>1-x</sub>Ni<sub>x</sub>O nanostructures for an excellent humidity sensor and a plausible sensing mechanism, **A. Sharma**, Y. Kumar, K. Mazumder, A.K. Rana, P. M. Shirage, **New Journal of Chemistry**, (2018), 42, 8445-8457. (I.F- 3.591)

6. Structural, optical and excellent humidity sensing behaviour of ZnSnO<sub>3</sub> nanoparticles: effect of annealing, **A. Sharma**, Y. Kumar, P. M. Shirage, **Journal of Materials Science: Materials in Electronics**, (2018), 29, 10769-10783. (I.F- 2.478)

7. Effect of Cu intercalation on humidity sensing properties of Bi<sub>2</sub>Se<sub>3</sub> topological insulator single crystals, K. Mazumder, **A. Sharma**, Y. Kumar, P. M. Shirage, **Physical Chemistry Chemical Physics**, (2018), 20, 28257-28266. (I.F- 3.676)

8. Enhancement of field electron emission in topological insulator Bi<sub>2</sub>Se<sub>3</sub> by Ni doping, K. Mazumder, **A. Sharma**, Y. Kumar, P. Bankar, M. A. More, R. Devan, P.M. Shirage, **Physical Chemistry Chemical Physics**, (2018), 20, 18429-18435. (I.F- 3.676)

9. Morphology-controlled synthesis and enhanced energy product (BH)<sub>max</sub> of CoFe<sub>2</sub>O<sub>4</sub> nanoparticles, Y. Kumar, **A. Sharma**, Md. A. Ahmed, S. Mali, C. K. Hong, P. M. Shirage, **New Journal of Chemistry**, (2018), 42, 15793-15802. (I.F- 3.591)

10. Impact of Different Morphological Structures on Physical Properties of Nanostructured SnSe, G. Shanmugam, U. P. Deshpande, **A. Sharma**, P. M. Shirage, P.A. Bhoje, **Journal of Physical Chemistry C**, (2018), 122, 13182-13192. (I.F- 4.126)

11. Mesoporous nickel cobalt hydroxide/oxide as an excellent room temperature ammonia sensor, **A. Sharma**, P. Bhojane, A. K. Rana, Y. Kumar, P. M. Shirage, **Scripta Materialia** (2017), 128, 65-68. (I.F- 5.611)

12. Shape-controlled CoFe<sub>2</sub>O<sub>4</sub> nanoparticles as an excellent material for humidity sensing, Y. Kumar, **A.Sharma**, P. M. Shirage, **RSC Advances**, (2017), 7, 55778-55785. (I.F-3.361)

13. Synthesis of Ammonia Assisted Porous Nickel Ferrite (NiFe<sub>2</sub>O<sub>4</sub>) Nanostructures as an Electrode Material for Supercapacitors, P. Bhojane, **A. Sharma**, M. Pusty, Y. Kumar, S. Sen, P. M. Shirage, **Journal of Nanoscience and Nanotechnology**, (2017), 17, 1387-1392. (I.F- 1.354)

14. Comparative Study with a Unique Arrangement to Tap Piezoelectric Output to Realize a Self Poled PVDF Based Nanocomposite for Energy Harvesting Applications, M. Pusty, **A.Sharma**, L. Sinha, A. Chaudhary, P.M. Shirage, **ChemistrySELECT**, (2017), 2, 2774-2782. (I.F- 2.109)

#### **Conference Proceedings (Published):**

15. Engineering the optical and magnetic properties of Zn doped CoF<sub>2</sub>O<sub>4</sub> nanoparticles, Y. Kumar, **A.Sharma**, K. Mazumder, P. M. Shirage, **AIP Conference Proceedings**, (2020), 2265, 030103(1-4).

16. Synthesis and humidity sensing behaviour of Cu- intercalated Bi<sub>2</sub>Se<sub>3</sub> topological insulator single crystals, **A. Sharma**, K. Mazumder, Y. Kumar, P. M. Shirage, **AIP Conference Proceedings**, (2019), 2115, 030407(1-4).

17. Temperature dependent I-V characteristics of Ni doped topological insulator Bi<sub>2</sub>Se<sub>3</sub> nanoparticles, K. Mazumder, **A. Sharma**, Y. Kumar, P. M. Shirage, **AIP Conference Proceedings**, (2019), 2115, 030147(1-4).

18. Synthesis of humidity sensitive zinc stannate nanomaterials and modelling of Freundlich adsorption isotherm model, **A. Sharma**, Y. Kumar, P. M. Shirage, **AIP Conference Proceedings**, (2018), 1942, 050095(1-4).

#### **Publications (Communicated/Under Preparation/Revision Submitted):**

1. **A. Sharma**, P.M. Shirage, Insight into Graphene Oxide (GO) and reduced Graphene Oxide (rGO) based Humidity Sensors: A Review, (Revision Submitted).

2. **A.Sharma**, P.M. Shirage, Adaptive estimation of measurement error in chemiresistive sensors and its correlation with sensitivity, (Revision submitted).

3. **A. Sharma**, P.M. Shirage, Deciphering the role of post treatment temperature in sorption/desorption induced hysteresis of ZnSnO<sub>3</sub> based humidity sensors, (**Revision submitted**).
4. Y. Kumar, **A.Sharma**, P.M. Shirage, Role of controlled Morphology of CoFe<sub>2</sub>O<sub>4</sub> nanoparticles on room temperature ammonia gas sensing, (**Under Revision**).
5. **A.Sharma**, P. M. Shirage, Negative Temperature Coefficient Behavior of ZnSnO<sub>3</sub> nanomaterials for temperature sensor applications, (**Communicated**).
6. **A.Sharma**, P. M. Shirage, Transient kinetic response analysis of carbon dioxide gas sensing by zinc stannate nanomaterials, (**Communicated**).
7. **A.Sharma**, P.M. Shirage, Variation of thermal index behaviour of ZnSnO<sub>3</sub> nanomaterial based Temperature sensors: Effect of physical properties, (**Communicated**).
8. **A. Sharma**, P.M. Shirage, Study of differential calibration method to overcome the saturation and recovery issues in transition metal doped ZnO gas sensors, (**Communicated**).
9. **A.Sharma**, P.M. Shirage, Thermodynamic assessment of metal stannate based gas sensors under ambient conditions. (**Under preparation**)
10. **A.Sharma**, P. Bhojane, P.M. Shirage, Spinel NiCo<sub>2</sub>O<sub>4</sub> as humidity sensor- A detailed adsorption isotherm study, (**Under Preparation**).
11. **A. Sharma**, K. Mazumder, P. M. Shirage, Machine learning approach to understand the sensing pattern of topological Bi<sub>2</sub>Se<sub>3</sub> nanomaterials, (**Under preparation**).
12. K. Mazumder, **A.Sharma**, P.M. Shirage, Bias controlled tunable electronic transport in Bi<sub>2</sub>Se<sub>3</sub> topological insulator single crystal, (**Under preparation**).
13. K. Mazumder, **A.Sharma**, P.M. Shirage, Scalable fabrication of highly sensitive temperature sensors based on transition metal (Cu and Ni) intercalated Bi<sub>2</sub>Se<sub>3</sub> nanoparticles, (**Under preparation**).
14. **A.Sharma**, A. N. Acharya, Subjection of Response Surface Method to understand role of Physico-chemical factors in Optimization of Photocatalytic dye degradation process, (**Under Preparation**).

## PRESENTATIONS

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1. Poster presentation at “*Ramanujan Conclave*”, 22<sup>nd</sup>-23<sup>rd</sup> December, 2015 at Indian Institute of Technology Indore, Indore, India.
2. Poster presentation at “*Silver Jubilee Conference on Study of Matter using Intense Radiation Sources and Under Extreme Conditions*”, 3<sup>rd</sup> -6<sup>th</sup> November, 2016 at UGC-DAE Consortium for Scientific Research Indore, India.
3. Poster presentation at “*Fourth International Symposium on Semiconductor Materials and Devices (ISSMD 4)*”, 8<sup>th</sup> -10<sup>th</sup> March, 2017 at Jadavpur University.

4. Oral presentation at “*International conference on nanotechnology: Ideas, Innovations & Initiatives (ICN: 3I-2017)*”, 6<sup>th</sup> -8<sup>th</sup> December, 2017 at Indian Institute of Technology, Roorkee, India.
5. Poster presentation at “*62<sup>nd</sup> DAE- Solid State Physics Symposium*”, 25-30 December, 2017, at Bhabha Atomic research Centre, Mumbai.
6. Oral/Poster presentation at “*63<sup>rd</sup> DAE- Solid State Physics Symposium*”, 18-22 December, 2018, at Guru Jambheshwar University of Science and Technology, Hisar, Haryana.
7. GIAN workshop on “*High-Pressure Synthesized Materials: A Chest of Treasure and Hints*”, at Indian Institute of Technology Indore, India 11<sup>th</sup> – 19<sup>th</sup> July 2016.
8. GIAN workshop on “*Chemical Sensors: Principles, Technologies and Applications*”, at Indian Institute of Technology Indore, India 1<sup>st</sup> – 9<sup>th</sup> July 2016.

## RESEARCH INTERESTS

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Nanomaterials, Single crystals, Nano-composites, Magnetic materials, Chemical Sensor, Temperature sensor, Chemical Thermodynamics, Kinetics, Machine Learning

## RESEARCH SKILLS

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- Synthesis of nanomaterials with several morphologies using hydrothermal, wet-chemical, microwave, sputtering techniques etc.
- Analysis of different physical characterization methods: P-XRD, FESEM, EDX, UV-Vis spectra, Raman, AFM, BET, TGA, FTIR, TEM, XPS, Contact Angle.
- Hands-on expertise with the instruments such as P-XRD(RIGAKU SMARTLAB, BRUKER D2 PHASER), FE-SEM ( JEOL JSM 7610F, Supra 55 ZEISS), UV-Vis spectrometer( Perkin Elmer Lambda 35), FTIR( Bruker)
- Hands-on expertise on DC and RF- sputtering units, Pulsed Laser Devices for thin film synthesis and Thermal Evaporators for contact fabrication.

## AWARDS AND FELLOWSHIPS

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- Awarded CSIR- **Senior Research Fellowship (SRF)**, Govt. of India in May 2018.
- **Doctoral fellowship** from Ministry of Human Resource and Development (MHRD), Government of India from July 2015 to May 2018.
- South Asian Foundation (SAF) fellowship by **SAARC (South Asian Association for Regional Co-operation)** for pursuing M.Tech in Green Energy Technology from July 2013- May 2015.
- Selected for **IRCC-IITB Research Internship Award-2015** for carrying out internship at Department of Metallurgical Engineering &Material Science, IITB.
- Selected for **SERB- International Travel Support (SERB-ITS) fellowship**, Govt. of India. (**Not Availed**)

## PROFESSIONAL MEMBERSHIPS

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- Editorial Board Member, BMC Chemistry (Part of Springer-Nature) I.F-2.493
- Topic Editor, Frontiers in Electronic Materials

## PERSONAL INFORMATION

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**D.O.B-** 29<sup>th</sup> June 1989

**Nationality-** Indian

**Language(s)** - English, Hindi, Odia

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Near Imperial College of Hotel Management,  
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P.O/ Dist. – Angul, Pin- 759122, Odisha, India

## ACADEMIC/PROFESSIONAL REFERENCES

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### 1. Dr. Parasharam M. Shirage

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Discipline of Metallurgy Engineering and Materials Science  
Indian Institute of Technology Indore  
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### 2. Dr. Rupesh Devan

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### 3. Prof. P. Elumalai

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## DECLARATION

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I hereby declare that the above-mentioned information is correct upto my knowledge and I bear the responsibility for the correctness of the above mentioned particulars.

Date: April 2022

Place: Bhubaneswar, India