



Dr. Manish Kumar Tiwari

Translational Research Fellow
(TRF)
Metallurgical Engineering and Materials Science
Indian Institute Of Technology, Indore
India

+91-9165287211
manish11221@gmail.com
manishtiwari@iiti.ac.in
Google Scholar
Linkedin
Website



EDUCATION

Degree/Certificate	Institute/Board	CGPA/Percentage	Year
Ph.D.	Indian Institute of Technology Indore	9.00	2025
M.Tech.	Indian Institute of Technology Indore	9.5	2020
B.Tech.	Lovely Professional University	8.78	2014
Senior Secondary	CBSE	73.4%	2009
Secondary	CBSE	78.8%	2007

EXPERIENCE

- Indian Institute of Technology Indore** May. 2025 - Present
Translational Research Fellow - Department of Metallurgical Engineering and Materials Science
IIT Indore, India
- Indian Institute of Technology Indore** Oct. 2022 - May 2025
Senior Research Fellow - Department of Metallurgical Engineering and Materials Science
IIT Indore, India
 - First Author Publications: 04, Gas Sensor
 - Co-author Publications: 13, Na-ion Batteries (5), Solar Cell (8)
- Indian Institute of Technology Indore** Aug. 2020 - Dec. 2024
Teaching Assistant - Department of Metallurgical Engineering and Materials Science
IIT Indore, India
 - Composites Development Lab
 - Materials for Devices Lab
- Indian Institute of Technology Indore** Aug. 2020 - Oct. 2022
Junior Research Fellow - Department of Metallurgical Engineering and Materials Science
IIT Indore, India
 - First Author Publications: 01, Gas Sensor
 - Co-author Publications: 02, Sodium-ion Batteries, Solar Cell
- Indian Institute of Technology Indore** Jul. 2018 - May 2020
Teaching Assistant - Department of Mechanical Engineering
IIT Indore, India
 - Mechanical Workshop Lab
 - Lathe Machine Theory and Operation: Turning, Facing, Taper Turning etc.

PROJECTS

- Ph.D. Project: Advanced Functional Materials for Next Generation Gas Sensing Applications** Aug. 2020 - May 2025
Supervisor: Prof. Parasharam M. Shirage
Google Scholar
 - First Author Publications: 04
 - Co-author Publications: 13
- M.Tech. Project: Fabrication and Characterization of Hybrid Solar Cell at Ambient Condition** Jul. 2018 - May 2020
Supervisor: Prof. Parasharam M. Shirage
 - FTO/c – TiO_2/TiO_2 NRs/ $CH_3NH_3PbI_3$ /NiO/Au -based Solar cell
 - Perovskite Solar Cell
- Capstone Project: Study of Mechanical Properties of Steel** Aug. 2013 - May 2014
Supervisor: Mr. Amritpreet Singh
 - Effect on Mechanical Properties of EN8, EN24, EN31 and D3 steel
 - Heat treatment process: Annealing, Normalizing, Oil and Water Quenching

RESEARCH SKILLS

- Synthesis of nanomaterials:** Hydrothermal method, Sol-gel method, Wet-chemical, Coating by RF/DC Sputtering, etc.
- Density Functional Theory Computations of Advanced Materials (DFT-Advanced):** using Quantum Espresso, Burai and Vesta Software Packages.
- Analysis of different physical characterization methods:** P-XRD, FESEM, EDX, UV-Vis spectra, Raman Spectroscopy, AFM, BET/BJH Analysis, TGA, FTIR, HRTEM, XPS
- Hands-on expertise with the Instruments:** P-XRD (RIGAKU SMARTLAB, BRUKER D2 PHASER), FE-SEM (JEOL JSM 7610F, Supra 55 ZEISS), UV-Vis spectrometer (Perkin Elmer Lambda 35), FTIR (Bruker), RF/DC Sputtering

- **Oral Presentation:** "IEEE Sensors Council" held at Indian Institute of Technology, Indore, India during 3rd-4th October, 2024. (Topic: $W_{18}O_{49}$ Nanofibers Functionalized with Graphene as a Selective Sensing of NO_2 gas at Room Temperature)
- **Oral Presentation:** "4th International Conference on Advanced Materials Synthesis, Characterisation and Applications-2024 (AMSCA-2024)" held at Queensland University of Technology, Brisbane, Australia, from 25th to 27th September, 2024. (Topic: NASICON-type $Na_3Fe_2(PO_4)_3$ Material for Ultra-Sensitive Room Temperature CO Gas Sensor)
- **Oral Presentation:** "International Conference on Advanced Materials Synthesis, Characterization and Applications (AMSCA Maverick-2022)", at Department of Physics, Savitribai Phule Pune University, Pune-07, Maharashtra, India, 18th-20th October, 2022. (Topic: Synthesis, characterization and sensing performance of NASICON-type $Na_3Fe_2(PO_4)_3$ for CO gas sensing at room temperature)
- **Workshop:** "Empowering Women in Sensor Technology (EWST'22)", IEEE Sensors Council, December 2022, IIT Indore
- **Workshop:** "Workshop on Sensors" organized by Indo-South Korea joint Network Center for Environmental Cyber Physical Systems- JNC Node1, November 2021, Department of Physics, IIT Roorkee jointly with IIT Indore and Gauhati University
- **Webinar:** "Nanotechnology Enabled Memristive Devices and Systems for Neuromorphic Computation and its Associate Applications", IEEE Nanotechnology Council (NTC), November 2021, IIT Indore

PUBLICATIONS

1. **M. K. Tiwari**, S. C. Yadav, A. Srivastava, A. R. Kanwade, J. A. K. Satrughna, S. S. Mali, J. V. Patil, C. K. Hong and P. M. Shirage, Enhancement of CO gas sensing performance by Mn-doped porous $ZnSnO_3$ microspheres, *RSC Adv.*, 2022, 12, 32249–32261. (**IF** = **4.036**). DOI:10.1039/d2ra06785d
2. **M. K. Tiwari**, A. R. Kanwade, S. C. Yadav, A. Srivastava, J. A. K. Satrughna and P. M. Shirage, NASICON-type $Na_3Fe_2(PO_4)_3$ material for an excellent room temperature CO sensor, *J. Mater. Chem. C*, 2023, 11, 5469-5480. (**IF** = **8.067**). DOI:10.1039/d3tc00300k.
3. **M. K. Tiwari**, S. C. Yadav, A. R. Kanwade, J. A. K. Satrughna, S. M. Rajore and P. M. Shirage, Advancements in lanthanide-based perovskite oxide semiconductors for gas sensing applications: a focus on doping effects and development, *Anal. Methods*, 2023, 15, 5754-5787. (**IF** = **3.1**). DOI: <https://doi.org/10.1039/D3AY01420G>
4. **M. K. Tiwari**, A. R. Kanwade, S. M. Rajore, J. A. K. Satrughna, Y. Ito, H. Lee, Y. Ohshita, A. Ogura, S. S. Mali, J. V. Patil, C. K. Hong and P. M. Shirage, $W_{18}O_{49}$ Nanofibers Functionalized with Graphene as a Selective Sensing of NO_2 gas at Room Temperature, *ACS Appl. Mater. Interfaces*, 2024, 16, 49520-49532. (**IF** = **8.3**). DOI: <https://doi.org/10.1021/acsami.4c10014>

Co-author:

5. A. R. Kanwade, S. Gupta, A. Kankane, **M. K. Tiwari**, A. Srivastava, J. A. K. Satrughna, S. C. Yadav and P. M. Shirage, Transition metal oxides as a cathode for indispensable Na-ion batteries, *RSC Adv.*, 2022, 12, 23284–23310. (**IF** = **4.036**). DOI:10.1039/d2ra03601k
6. A. Srivastava, B. S. Chauhan, S. C. Yadav, **M. K. Tiwari**, J. A. K. Satrughna, A. R. Kanwade, K. Bala and P. M. Shirage, Performance of dye-sensitized solar cells by utilizing Codiaeum Variegatum Leaf and Delonix Regia Flower as natural sensitizers, *Chem. Phys. Lett.*, 2022, 807, 140087. (**IF** = **3**). DOI:10.1016/j.cplett.2022.140087
7. A. Srivastava, J. A. K. Satrughna, **M. K. Tiwari**, A. R. Kanwade, S. C. Yadav, K. Bala and P. M. Shirage, Effect of $Ti(1-x)Fe_xO_2$ photoanodes on the performance of dye-sensitized solar cells utilizing natural betalain pigments extracted from Beta vulgaris (BV), *Energy Adv.*, 2023, 2, 148–160. (**IF** = **3.31**). DOI:10.1039/d2ya00197g
8. A. S. Teja, A. Srivastava, J. A. K. Satrughna, **M. K. Tiwari**, A. R. Kanwade, S. C. Yadav and P. M. Shirage, Optimal processing methodology for futuristic natural dye-sensitized solar cells and novel applications, *Dye. Pigment.*, 2023, 210, 110997. (**IF** = **4.15**). DOI:10.1016/j.dyepig.2022.110997
9. S. C. Yadav, **M. K. Tiwari**, A. R. Kanwade, H. Lee, A. Ogura and P. M. Shirage, Butea monosperma, crown of thorns, red lantana camara and royal poinciana flowers extract as natural dyes for dye sensitized solar cells with improved efficiency, *Electrochim. Acta*, 2023, 441, 141793. (**IF** = **5.5**). DOI:<https://doi.org/10.1016/j.electacta.2022.141793>
10. J. A. K. Satrughna, A. R. Kanwade, A. Srivastava, **M. K. Tiwari**, S. C. Yadav, A. S. Teja and P. M. Shirage, Experimental and computational advancement of cathode materials for futuristic sodium ion batteries, *Mater. Today*, 2023, 65, 107371. (**IF** = **21.1**). DOI: <https://doi.org/10.1016/j.mattod.2023.06.013>
11. A. Srivastava, J. A. K. Satrughna, **M. K. Tiwari**, A. R. Kanwade, S. C. Yadav, K. Bala and P. M. Shirage, Lead metal halide perovskite solar cells: Fabrication, advancement strategies, alternatives, and future perspectives, *Mater. Today Commun.*, 2023, 35, 105686. (**IF** = **3.7**). DOI: <https://doi.org/10.1016/j.mtcomm.2023.105686>

12. A. S. Teja, A. Srivastava, J. A. K. Satrughna, **M. K. Tiwari**, A. R. Kanwade, H. Lee, A. Ogura and P. M. Shirage, Synergistic co-sensitization of environment-friendly chlorophyll and anthocyanin-based natural dye-sensitized solar cells: An effective approach towards enhanced efficiency and stability, *Solar Energy*, 2023, 261, 112-124. (**IF** = **6**). DOI: <https://doi.org/10.1016/j.solener.2023.06.004>
13. A. S. Shaikh, S. C. Yadav, A. Srivastava, A. R. Kanwade, **M. K. Tiwari**, S. M. Rajore, J. A. K. Satrughna, M. Dhonde, and P. M. Shirage, Dynamic synergy of tin in the electron-transfer layer and absorber layer for advancing perovskite solar cells: a comprehensive review, *Energy Adv.*, 2024. (**IF** = **3.2**). DOI: <https://doi.org/10.1039/D4YA00204K>
14. S. M. Rajore, A. R. Kanwade, J. A. K. Satrughna, **M. K. Tiwari**, and P. M. Shirage, A comprehensive review on advancements in catalysts for aluminum-air batteries, *J. Power Sources*, 2024, 616, 235101. (**IF** = **8.1**). DOI: <https://doi.org/10.1016/j.jpowsour.2024.235101>
15. J. A. K. Satrughna, A. R. Kanwade, S. M. Rajore, **M. K. Tiwari**, Y. Ito, A. Ogura, H. Lee, Y. Ohshita and P. M. Shirage, Sol-gel based synthesis of high-capacity- $NaCoO_2$ cathode for advanced sodium-ion batteries, *Electrochim. Acta*, 2024, 507, 145201. (**IF** = **5.5**). DOI: <https://doi.org/10.1016/j.electacta.2024.145201>
16. J. A. K. Satrughna, A. R. Kanwade, S. M. Rajore, **M. K. Tiwari**, Y. Ito, A. Ogura, H. Lee, Y. Ohshita, S. S. Mali, J. V. Patil, C. K. Hong, and P. M. Shirage, Unveiling the physicochemical and electrochemical features of sodium deficient- $Na_{0.8}Fe(SO_4)_2$ as cathode for sodium-ion batteries, *Next Research*, 2025, 100210. DOI: <https://doi.org/10.1016/j.nexres.2025.100210>
17. A. S. Shaikh, A. R. Kanwade, J. A. K. Satrughna, **M. K. Tiwari**, S. M. Rajore, S. C. Yadav, Y. Ito, H. Lee, Y. Ohshita, A. Ogura, and P. M. Shirage, Ambient condition synthesis of $Cs_2AgBiBr_6$ -double perovskite and its solar cell performances, *J. Power Sources*, 2025, 653, 237717. (**IF** = **7.9**). DOI: <https://doi.org/10.1016/j.jpowsour.2025.237717>

RESEARCH INTERESTS

- **Sensors** : Sensor Technology, Environmental Monitoring Technologies
- **Energy Conversion Devices**: Perovskite Solar Cell, Dye-sensitized Solar Cell
- **Energy Storage Devices**: Sodium-ion Batteries, Li-ion Batteries
- **Energy Materials**: Renewable Energy Systems

KEY COURSES TAKEN

- Hands-on-Training Program on Density Functional Theory Computations of Advanced Materials (**DFT-Advanced**) organized by the Centre for Advanced Computational Research, Delhi July 2025
- QIP Short-term Courses, AICTE
 - Materials Engineering from Synthesis to Applications, IIT Indore Feb. 2022
 - Advanced Materials for Environmental Sensors, IIT Indore March 2022
 - Synthesis and Characterization of Thin Films, IIT Indore March 2022

POSITIONS OF RESPONSIBILITY

- **Mentorship**: Mentored two B.tech. students for their B.Tech project on Gas Sensor Jul. 2024- Dec. 2024
- **Event Organizer**: International workshop on "Energy Conversion and Sustainable Future", Prof. Parasharam M. Shirage (Dept. of MEMS), IIT Indore, India. 23-24 Jan. 2024
- **Event Organizer**: SERB sponsored KARYASHALA (High-End Workshop) on "Energy Materials Synthesis, Characterization, and Device Fabrication", IIT Indore, India. 03-08 Jul. 2023
- **Resource person- Faculty Development Programme**: "Recent Development in Energy Materials for Sustainable Future" by ATAL AICTE organized by Indian Institute of Technology Indore, India. 21 Nov.-01 Dec. 2022

ACHIEVEMENTS

- **Translational Research Fellowship (TRF)**, IIT Indore 2025
- **Senior Research Fellowship (SRF)**, Govt. of India 2022-25
- **Junior Research Fellowship (JRF)**, Govt. of India 2020-22
- **GATE 2018**, SCORE: 676 2018

ACADEMIC/PROFESSIONAL REFERENCES

1. Prof. Parasharam M. Shirage
Professor,
Department of Metallurgical Engineering and Materials Science,
Indian Institute of Technology Indore
Indore - 453552, Madhya Pradesh, India.
Email: pms Shirage@iiti.ac.in
Contact: +91-7316603330 / +91-7875222331
2. Dr. Sawanta S. Mali
Associate Research Professor,
Marie Sklodowska- Curie Actions COFUND Energy for Future (E4F) Fellow,
Brain Pool (former KRF) fellow| DSK fellow,
An outstanding overseas young researcher
Chonnam National University, Gwangju, South Korea.
Email: sawanasolar@gmail.com, sawanta@jnu.ac.kr
Cell: +82-10-8940-9842 / +91-9657128698
3. Prof. Mohan Lal Kolhe
Professor,
Department of Engineering Sciences,
University of Agder, Norway.
Email: mohan.l.kolhe@uia.no
Contact: +4793414532 / +91-9329686919

DECLARATION

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

Date:

Place: Indore, India
