

## CONTACT DETAILS

ADDRESS  
Dr. Sandeep Kumar Maurya (PDRF)  
**Department of Physical Sciences,**  
**IISER Berhampur**  
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## SUMMARY

I am an early career researcher working on thin film devices for optoelectronic application. I primarily use RF-sputtering, atomic layer deposition (ALD), and thermal evaporation to develop ultra thin and thin films for renewable energy and LED applications.

## EDUCATION

- M.Sc-Ph.D (Dual degree) 2020  
**Indian Institute of Technology Bombay**, Mumbai, India  
*Cumulative Performance Index (CPI) of 7.6/10*  
*Thesis: Fabrication of Cu:ZnS as a p-type transparent conductor*
  
- Bachelor of Science (Hons) in Physics 2010  
Institute of Science, **Banaras Hindu University**, Varanasi, India

## RESEARCH EXPERIENCES

- Postdoctorate:**  
**Institute Postdoctoral Research Fellow** *January 2021 - January 2022*  
**Department of Physics, IISER Berhampur**, Orissa, India
- Objective:**
  - Fabrication of organic-inorganic hybrid perovskite LEDs
- Research Associate:**  
Host: **Prof. Balasubramaniam Kavaipatti** *September 2019 - March 2020*  
**Indian Institute of Technology Bombay**, Mumbai, India
- Objective:**
  - Fabrication of carrier selective contacts such as  $\text{NiO}_x$ , ITO and  $\text{MoO}_x$  via RF sputtering and thermal evaporation for its application in Si and perovskite-based photovoltaic devices

- Ph.D. Project: Fabrication of Cu:ZnS as a p-type transparent conductor** *2014 - 2020*  
Supervisors: **Prof. Balasubramaniam Kavaipatti**  
**Indian Institute of Technology Bombay**, Mumbai, India
- Objective(s):**
  - High figure-of-merit p-type transparent conducting Cu alloyed ZnS thin films via RF-sputtering
  - Fabrication of p-type transparent conducting Cu:ZnS via atomic layer deposition (ALD)
  - Study of carrier transport mechanism in sputtered and ALD films

- Visiting Research Fellow: Fabrication of a novel p-type Transparent conductor** *August 2015 - December 2015*  
Supervisor: **Prof. Joel W. Ager III**  
**Electronic Materials Program,**  
**Lawrence Berkeley National Laboratory (LBNL), California**, USA

- Master's Project: Characterization of as-deposited and annealed zinc nitride ( $\text{Zn}_3\text{N}_2$ ) thin film developed via atomic layer deposition (ALD) technique** *July 2012 - December 2013*  
Supervisors: **Prof. Balasubramaniam Kavaipatti**  
**Indian Institute of Technology Bombay**, Mumbai, India

- SCHOLASTIC ACHIEVEMENTS**
- **Institute Post Doctorate Research Fellow** at Department of Physical Sciences IISER Berhampur INDIA (January 2021– Present)
  - **Solar Energy Research Institute for India and the United States (SERIUS) and the McDonnell Academy Global Energy and Environmental Partnership (MAGEEP) fellowship 2015**
  - Institute Travel Grant from IIT Bombay 2016
  - All India Rank 171<sup>st</sup> (IIT JAM Physics 2011)

- TECHNICAL SKILLS**
- Operating Systems:** Linux (Debian family), Windows
- Software:** LATEX, X'PERT High Score Plus, JCPDS, XPSPEAK 4.1, Origin, SIMNRA, CrystalMaker, CrystalDiffract, MS Office
- Tools:** Atomic layer deposition (ALD), DC and RF sputtering, Hall Measurement system (Low temperature operation), Raman Spectroscopy, Cross-section TEM sample preparation, Thermal evaporation, Glove box operation, Spin coating, Atomic force microscopy (AFM), Scanning electron microscopy (SEM), X-ray diffraction, UV-Vis NIR, Ellipsometry, FLS1000 Photoluminescence Spectrometer

- PUBLICATIONS**
- Published Journal Articles**
1. **Maurya, S.K.**, Liu, Y., Xu, X., Woods-Robinson, R., Das, C., Ager III, J. W., & Kavaipatti, B.K., (2017) **High figure-of-merit p-Type Transparent Conductor, Cu alloyed ZnS via Radio Frequency Magnetron Sputtering**. *Journal of Physics D: Applied Physics*, 50(50), 505107. [Impact Factor: 3.169, SCImago rank: Q1]
  2. Mahuli, N., Saha, D., **Maurya, S. K.**, Sinha, S., Patra, N., Kavaipatti, B., & Sarkar, S. K. (2018) **Atomic Layer Deposition of Transparent and Conducting p-Type Cu Incorporated ZnS Thin Films: Unravelling the Role of Compositional Heterogeneity on Optical and Carrier Transport Properties**. *Journal of Physical Chemistry C*, 122(28), 16356-16367. [Impact Factor: 4.309, SCImago rank: Q1]
  3. Kumar, A., **Maurya, S. K.**, Chawla, S., Patwardhan, S., & Kavaipatti, B. K. (2019). **Effect of Thickness on Metal to Semiconductor Transition in La doped BaSnO<sub>3</sub> Thin Films Deposited on High Mismatch LSAT Substrates**. *Applied physics letters*, 114(21), 212103. [Impact Factor: 3.791, SCImago rank: Q1]
  4. Kumar, A., **Maurya, S. K.**, Patwardhan, S., & Kavaipatti, B. K. (2020) **Opto-electronic properties of poly-crystalline La doped BaSnO<sub>3</sub> films deposited on quartz substrates**. *Journal of Physics D: Applied Physics*, 54(18), 185108. [Impact Factor: 3.169, SCImago rank: Q1]
  5. Aggarwal, G., **Maurya, S. K.**, Singh, A. K., & Kavaipatti, B. K. (2019). **Intrinsic Acceptor-like Defects and Their Effect on Carrier Transport in Polycrystalline Cu<sub>2</sub>O Photocathodes**. *The Journal of Physical Chemistry C* 123 (43), 26057-26064. [Impact Factor: 4.309, SCImago rank: Q1]
  6. Aggarwal, G., Das, C., Agarwal, S., **Maurya, S. K.**, Nair, P. R., & Kavaipatti, B. K. (2018). **Hall Mobility of As-Grown Cu<sub>2</sub>O Thin Films Obtained via Electrodeposition on Patterned AuSubstrates**. *Physica Status Solidi (RRL) Rapid Research Letters*, 12(1), 1700312. [Impact Factor: 3.729, SCImago rank: Q1]
  7. Das, C., Singh, A. K., Heo, Y., Aggarwal, G., **Maurya, S. K.**, Seidel, J., & Kavaipatti, B. K. (2018). **Effect of Grain Boundary Cross-Section on the Performance of Electrodeposited Cu<sub>2</sub>O Photocathodes**. *The Journal of Physical Chemistry C*, 122(3), 1466-1476. [Impact Factor: 4.309, SCImago rank: Q1]
  8. Bera, B., Priyadarshani, D., Joy, M. E., Tripathi, A. K., **Maurya, S. K.**, Kavaipatti, B. K., & Neergat M. (2019). **Origin of The Catalytic Activity Improvement of Electrochemically Treated Carbon – An Electrical and Electrochemical Investigation**. *The Journal of Physical Chemistry C* 123 (39), 23773-23782. [Impact Factor: 4.309, SCImago rank: Q1]

#### Submitted/Preprint Journal Articles

9. **Maurya, S. K.**, et. al. Tuning the optoelectronic properties of Cu<sub>x</sub>S-ZnS composite. (Manuscript soon to be submitted)
10. **Maurya, S. K.**, & Xu X. Review on Transparent Conductors. (*Energies MDPI*)
11. Patwardhan, S., **Maurya, S. K.**,et. al. Growth and Characterization of MoO<sub>x</sub> Layers with Varied Thickness Directly on Si – Optimization for Hole-selectivity and Surface Passivation. (Manuscript under review in *Progress in Photovoltaics: Research and Applications*)

**Selected International Conferences and Proceedings**

1. [MRS fall meeting](#), Boston (USA), 2016. (Oral presentation)
2. [MRS fall meeting](#), Boston (USA), 2016. (Oral presentation)
3. [15<sup>th</sup> International Conference on Atomic Layer Deposition](#), Portland (USA), 2015. (Oral presentation)
4. [42<sup>nd</sup> Photovoltaic Specialist Conference \(PVSC\)](#), New Orleans (USA), 2015. (Poster presentation)
5. [MRS fall meeting](#), Boston (USA), 2017. (Oral presentation)
6. [35<sup>th</sup> EU PVSEC](#), Boston (USA), 2018. (Poster presentation)
7. [APS March Meeting](#), Boston (USA), 2019. (Oral presentation)
8. [61<sup>st</sup> Electronic Materials Conference](#), Ann Arbor (USA), 2019. (Oral presentation)
9. [APS March Meeting](#), Denver (USA), 2020. (Poster presentation)
10. [37<sup>th</sup> EU PVSEC](#), 2020. (Video Conferencing)
11. [7<sup>th</sup> International Conference on Advances in Energy Research](#), Mumbai (India), 2020. (Poster presentation)

REFeree FOR  
JOURNALS

[Physica Scripta \(IOP science\)](#), [Materials Research Express \(IOP science\)](#), [Mechanical Systems and Signal Processing \(Elsevier\)](#)

POSITION OF  
RESPONSIBILITY

- **Social Secretary**, Hostel - 13, IIT Bombay *May 2013 - April 2014*
- **Teaching Assistant**, Department of Energy Science and Engineering, IIT Bombay *(January 2014 - April 2018)*
- **Teaching Assistant**, Variable temperature hall measurement, Industrial Research and Consultancy Centre IIT Bombay *(2014 - 2018)*

## REFERENCES

- **Prof. Balasubramaniam Kavaipatti**  
Department of Energy Science and Engineering, IIT Bombay, Mumbai, India  
Email: [bala.ramanathan@iitb.ac.in](mailto:bala.ramanathan@iitb.ac.in)
- **Prof. Joel W Ager III**  
Materials Sciences Division, Lawrence Berkeley National Laboratory (LBNL), CA, USA  
Email: [jwager@lbl.gov](mailto:jwager@lbl.gov)

PERSONAL  
DETAILS**Nationality:** Indian**Date of Birth:** December 7, 1988**Sex:** Male