

## Sakshi Kansal

Prime Minsiter's Research Fellow,

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**Broad Research Area:** Integrated energy generation and storage device, Perovskite solar cells, Supercapacitors, Batteries, Catalysis, Metal recycling

### Education

Year	Degree	Institution	CGPA/Percentage
2021	PhD	IIT Kharagpur	Ongoing
2019	BS-MS dual degree	IISER Bhopal	81.30%
2013	12th Standard	CBSE	85%
2011	10th Standard	CBSE	10

### Current position

**Research Scholar (PMRF), School of Energy Science and Engineering, IIT**

**Kharagpur Thesis Title:** Integrated Energy Generation and Storage systems

**Thesis Supervisors:** Prof. Amreesh Chandra and Dr. Trilok Singh

### Publications

1. **Sakshi et al.**, Superior-catalytic performance of NiCo layered double hydroxide nanosheets for the reduction of p- nitrophenol, *International journal of Hydrogen Energy*, 2022, 48, 21372.
2. **Sakshi et al.**, Integrated energy generation and storage systems for low power device application, *Energy storage*, 2022, e413.
3. **Sakshi et al.** High performing supercapacitors using  $Cr_2O_3$  nanostructures with stable channels, *Theoretical and Experimental insights. Materials Science and Engineering: B*, 2023, 293, 116438.
4. **Sakshi et al.**, Nanostructures of Transition Metal Oxides/Hydroxides: Their Synthesis and Use in Catalysis, Book Chapter in *Advances in materials science: fundamentals and applications*", Springer Nature (Under review)
5. **Sakshi et al.**, "Lattice strain induced d-band modulation in nanosheets of  $Cu_xNiCo$  layered double hydroxides for enhanced water electrolysis"-ACS Catalysis (cs-2023-05001j) (Under review)
6. **Chandra et al.**, Role of porosity and diffusion coefficient in porous electrode used in supercapacitors–Correlating theoretical and experimental studies, *Electrochemical Science Advances*, 2022.
7. **Singh et al.**, *Perovskite Solar Cell Remediation: Materials Assessment, Efficiency and Stability*, Catalysis Research, 2022.
8. **Singh et al.**, Halide perovskite in energy storage, sensing, memories, and piezoelectric application, in *Low-Dimensional Halide Perovskites*, Elsevier, 2022.
9. **Chandra et al.**, Time-dependent exfoliation study of  $MoS_2$  for its use as a cathode material in high-performance hybrid supercapacitors, *Nanoscale Advances*, 2023, 1172.
10. **Chandra et al.**, Flexible supercapacitors for wearable electronics using cost effective composites of layered 2- Dimensional  $MoS_2-SnS_2$  nanoparticles, *ACS Applied Energy Materials*, 2024. (ae-2023-02517p.R1)
11. **Chandra et al.**, Marigold-like  $MoS_2@MOF$ -Derived N-Doped Carbon as a Stable and High-Capacity Anode Material for Sodium-Ion Batteries, *ACS Applied Energy Materials*, 2024.
12. **Chandra et al.**, Magnetic Supercapacitors-Particle Morphology Have Significant Impact on the Electrochemical Performance, *Journal of Physical Chemistry C* 2023.

### Workshops & Conferences Attended

1. **ORAL PRESENTATION:** 15<sup>th</sup> NCSSI, IIT BHU, India-2023.
2. **ORAL PRESENTATION:** "E-MRS, Spring Meeting 2023" in Strasbourg, France-2023.
3. **ORAL PRESENTATION:** 1<sup>st</sup> International conference on supercapacitors and batteries, IIT Kharagpur, India-2022.
4. **POSTER:** Indo-Belgium Workshop on Upscaling and field scale application of bio-electrochemical systems for wastewater treatment and bioenergy recovery, IIT-KGP, India-2021.

5. **POSTER:** *International Conference on Energy and Advanced Materials 2021, IIIT Noida, India-2021.*
6. **POSTER:** *65<sup>th</sup> DAE Solid State Physics Symposium (DAE-SSPS 2021), Mumbai, India-2021.*
7. **POSTER:** *14<sup>th</sup> National Conference on Solid State Ionics (NCSSI-2021), New Delhi, India-2021.*

#### **Skills and Expertise**

1. *Material synthesis using ball milling, semi-chemical synthesis routes, 3D printing, electrospinning hydrothermal, electrosynthesis.*
2. *Material Characterization using operating instruments viz., XRD, BET, particle size analyzer, ZETA, FTIR, UV-Vis, SEM, TEM, HPLC, GC-MS.*
3. *Software and other techniques viz., AUTOLAB and Zahner (for electrochemical studies), LAMMPS, OVITO, VMD, Quantum Espresso (theoretical calculations).*

#### **Achievements & Awards**

1. **Suresh Chandra memorial award for Best oral presentation:** *15<sup>th</sup> National Conference on Solid State Ionics (NCSSI-15), IIT BHU, Varanasi, India-2023.*
2. **Best oral presentation for female researcher:** *1<sup>st</sup> International conference on supercapacitors and batteries, IIT Kharagpur, India-2022*
3. **Prime Minister Research Fellowship (PMRF):** *Ministry of Education, India, December 2019.*
4. **All India Rank (AIR) 34,** *Council of Scientific & Industrial Research-Junior Research Fellowship, December 2019, Discipline-Chemistry.*
5. **All India Rank (AIR) -72,** *Council of Scientific & Industrial Research-Junior Research Fellowship, June 2019, Discipline-Chemistry.*
6. **All India Rank (AIR) -133,** *Graduate Aptitude Test in Engineering (GATE)-2019, Discipline-Chemistry.*
7. **All India Rank (AIR)-13,** *Council of Scientific & Industrial Research-National Eligibility Test, Discipline-Chemistry.*
8. **DST INSPIRE Fellowship:** *Ministry of Education, India, August 2014.*

#### **Projects/Internships**

1. **Title: Layered Double Hydroxide as an electrocatalyst for enhanced overall water-splitting activity**

*Duration and Place: as Junior Research Fellow (JRF) at IISER Bhopal from May -Oct 2019*

*Description: Layered Double Hydroxide material was used as an electrocatalyst for OER, and HER and superior efficiency achieved that was comparable to noble-metal based catalysts.*

2. **Title: Synthesis of Layered Double Hydroxide and Graphene composites for high – performance supercapacitors**

*Duration: MS-student at IISER Bhopal from May-2018 to April-2019*

*Description: Layered Double Hydroxide and graphene composites were prepared using simple co-precipitation method. Further, through electrochemical analysis specific capacitance, energy density, power density calculated of the device.*

3. **Title: Synthesis and Characterization of Anderson-Evans type Chromium Molybdate and Aluminum-Molybdate Clusters for energy generation**

*Duration: Project student at IIT Delhi from May-July 2017*

*Description: Synthesis and characterization of Anderson-Evans cluster  $[XMo_6O_{24}]_9$  polyoxometalates (POMs) for energy conversion applications.*

4. **Title: Surface modification of Calcium Hydroxyapatite using Surfactants.**

*Duration: Project student at IIT Jodhpur from May-July 2016*

*Description: Morphological alteration using surfactant of Calcium Hydroxyapatite to enhance its surface area and analyse its affinity towards the adsorption of fluorine from groundwater.*