

Anuj Goyal

Assistant Professor, Department of Materials Science & Metallurgical Engineering

MSME-204; anujgoyal@msme.iith.ac.in; [Webpage](#)



Major Areas of Research:

- Electronic structure and atomistic materials modeling
- Defects in semiconductors
- Materials discovery for clean energy applications

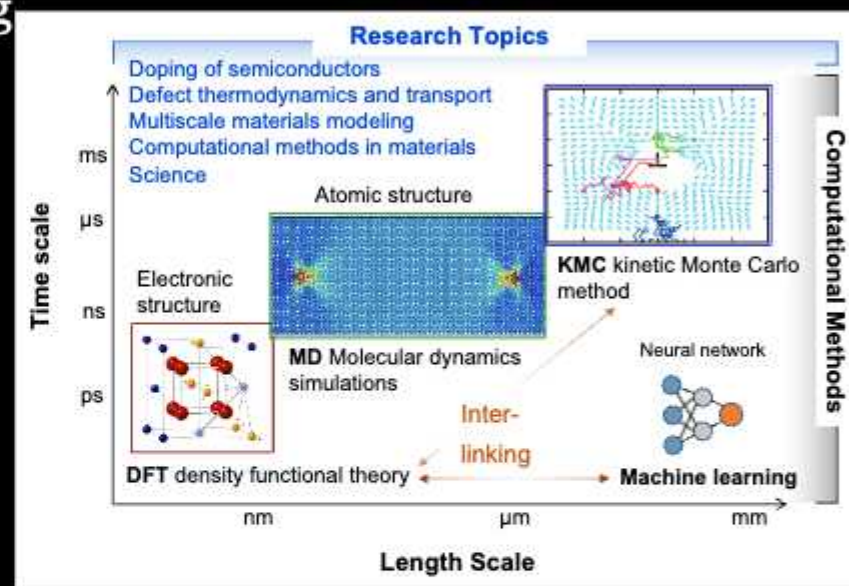
Major Research Facilities in the Group:

Supercomputing facilities at IITH

- NSM Param Seva
- High Performance Computing

Publications:

- A. Goyal, P. Gorai, H. Peng, S. Lany and V. Stevanovic, "A computational framework for automation of point defect calculations", *Computational Materials Science* 130, 1-9 **2017**. DOI:10.1016/j.commatsci.2016.12.040
- A. Goyal, P. Gorai, S. Anand, E. S. Toberer, G. J. Snyder and V. Stevanovic, "On the dopability of semiconductors and governing material properties", *Chemistry of Materials* 32, 11, 4467-4480 **2020**. DOI:10.1021/acs.chemmater.9b05126
- A. Goyal, A. Zakutayev, V. Stevanovic and S. Lany, "Computational Fermi level engineering and doping-type conversion of Mg:Ga₂O₃ via three-step synthesis processing", *Journal of Applied Physics* 129, 245704 **2021**. DOI:10.1063/1.5000000



Ashok Kamaraj

Assistant Professor ,Process Metallurgy Lab

Department of Materials Science & Metallurgical Engineering

Office No. 201, MSME building; ashokk@msme.iith.ac.in; [Webpage Link - Dr. Ashok Kamaraj Profile](#)



Major Areas of Research/Up to 3 major sponsored projects

Physical Modelling & simulation of metallurgical processes
Metal extraction, recycling & life cycle analysis of metallurgical processes
Development of alloy steel products & Certified Reference Materials

Major Research Facilities in the Group

Vacuum Induction melting furnace
High-temperature furnace for slag-metal equilibrium studies#
FactSage Software package#



under procurement stage

Technology/Product Developed/Up to 3 most significant Publications

Design of an auto dip mold simulator for simulation of initial solidification behavior during continuous casting process: Equipment Design Patent: NML/PAT0569/2019/IN, P/1152/12/2019, India.

DeoxyCalc-Version 1.0” A computer model for prediction of the amount of deoxidizers in Ladle Furnace: Software copyright: Ashok K, Gopi K Mandal, D Bandyopadhyay: CR-0092/2014, India.

Know-How for Hydrogen standard in steel (Technology): Certified Reference Materials (CRM): Ashok K, J K Sircar, A K Upadhyay, D Bandyopadhyay, M M Humane, J N Patel, D P Singh: CRM -501, July 2020, India.

Chandrasekhar Murapaka

Assistant Professor, Spintronic Device Lab

Department of Materials Science & Metallurgical Engineering

MSME 302; Institute Email: mchandrasekhar@msme.iith.ac.in

Webpage Link: <https://spintronics-group.webnode.page/>



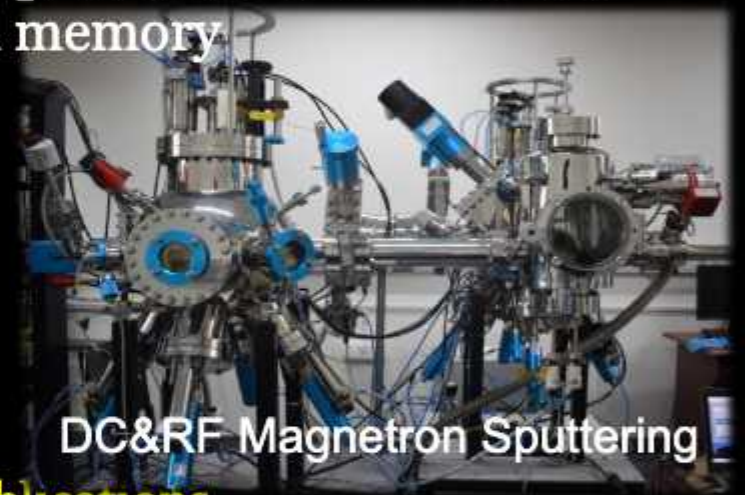
Major Areas of Research/Up to 3 major sponsored projects

Spinorbitronics, Skyrmion based devices, Pure spin current generation and detection

- ❖ Ferrimagnet based synaptic device for neuromorphic computing (SERB-CRG)
- ❖ Harnessing pure spin current by tailoring molecular spinterface (DAE-BRNS)
- ❖ Novel spin Hall materials for spin-orbit torque based memory and logic devices (JICA friendship 2023)

Major Research Facilities in the Group

- ❑ DC&RF Magnetron sputtering system (8 Targets)
- ❑ 2D Maskless lithography system
- ❑ Kerr Microscopy
- ❑ DC Probe station
- ❑ Magnetoresistance setup



DC&RF Magnetron Sputtering

Technology/Product Developed/Up to 3 most significant Publications

- ✓ B Paikaray, K. Mahathi, A Haldar, C. Murapaka, “Reconfigurable logic operations via gate controlled skyrmion motion in a nanomagnetic device”, ACS Applied Electronic Materials 4, 2209 (2022)
- ✓ T. Manoj, H. Perumal, B. Paikaray, A. Haldar, J. Sinha, P. P. Bhattacharjee, C. Murapaka, “Perpendicular magnetic anisotropy in a sputter deposited nanocrystalline high entropy alloy thin film”, Journal of Alloys and Compounds, 167337 (2022).
- ✓ K. Sriram, Jay Pala, B. Paikaray, A. Haldar, C. Murapaka, “Effect of Seed layer on Ta crystalline phase and spin Hall angle”, Nanoscale 13, 19985 (2021).



Deepu J. Babu

Assistant Professor, Nanoporous Materials Lab

Department of Materials Science & Metallurgical Engineering

MSME Block, Room #: 407, Mobile: 8289995143, Email: deepu.babu@msme.iith.ac.in, [Webpage](#)



Major Areas of Research

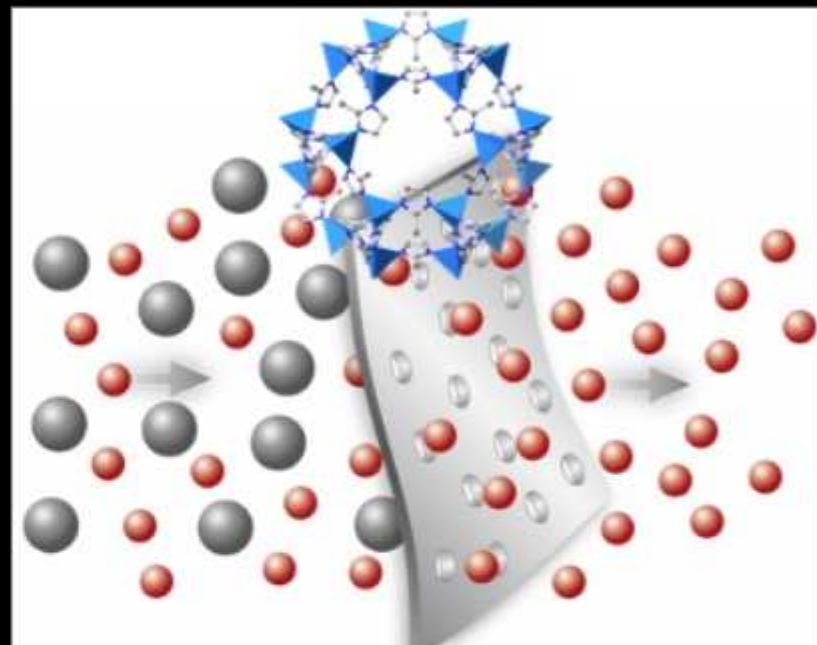
- Carbon Capture
- Adsorption/Membrane separation
- Nanoporous Materials
- CVD synthesis

Major Research Facilities in the Group

- Gas adsorption setup
- Membrane permeation setup
- BET surface area analyzer
- Plasma cleaner
- CVD setup for 2D materials growth

3 most significant Publications

1. D.J. Babu, G. He, K.V. Agrawal et al., Restricting Lattice Flexibility in Polycrystalline Metal–Organic Framework Membranes for Carbon Capture, *Advanced Materials*. 31 (2019) 1900855.
2. D.J. Babu, M. Bruns, J.J. Schneider, Unprecedented CO₂ uptake in vertically aligned carbon nanotubes, *Carbon*. 125 (2017) 327–335.
3. J. Hao, D.J. Babu, K.V. Agrawal et al., Synthesis of high-performance polycrystalline metal–organic framework membranes at room temperature in a few minutes, *J. Mater. Chem. A*. 8(2020) 7633–7640.



Mayur Vaidya

Assistant Professor, Department of Materials Science & Metallurgical Engineering

306.; +91-7879916780; vaidyam@msme.iith.ac.in; https://msme.iith.ac.in/assets/docs/profiles/MV_CV.pdf



Major Areas of Research/Up to 3 major sponsored projects

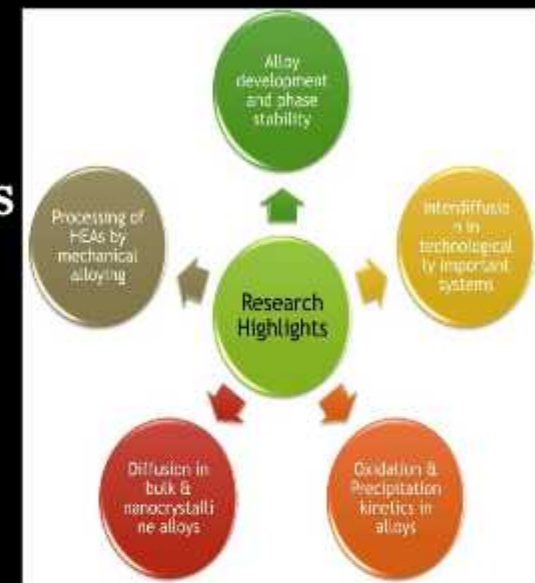
1. Oxidation behaviour of multicomponent alloys
2. Size and temperature effects on diffusion in materials
3. Design and development of steels and multicomponent alloys
4. Nanocrystalline multicomponent alloys by mechanical alloying and spark plasma sintering

Major Research Facilities in the Group

1. Thermal Evaporation System
2. Tubular Furnaces (max. temp - 600 °C and 1100 °C)
3. Low Speed Cutter, Diamond Wire Saw

Technology/Product Developed/Up to 3 most significant Publications

1. Burla, A., Khandelwal, M., & Vaidya, M. (2022). Antibacterial properties of Cu containing complex concentrated alloys. *Materials Today Communications*, 33, 104915.
2. M. Vaidya, Sandipan Sen, Lena Frommeyer, Lukas Rogal, S. Sankaran, Blazej Gabrowski, G. Wilde, S. V. Divinski, Phenomenon of ultra-fast tracer diffusion of Co in HCP high entropy alloys, *Acta Mater.* 196 (2020) 220-2303.
3. M. Vaidya, A. Karati, K. Guruvidyathri, M. Nagini, K.G. Pradeep, B.S. Murty, Suppression of σ -phase in nanocrystalline CoCrFeMnNiV high entropy alloy by unsolicited contamination during mechanical alloying and spark plasma sintering, *Mater. Chem. Phys.* 255 (2020) 123558



Mudrika Khandelwal

Associate Professor, Cellulose & Composites Group

Department of Materials Science & Metallurgical Engineering

Phone No.; Mobile 9966355510; Mudrika@msme.iith.ac.in; <https://people.iith.ac.in/mudrika/>



Major Areas of Research:

Drug Delivery, Antimicrobial Materials, Battery, Soft Actuators, Food Packaging, Depth Filters, Hydrophobic Surfaces

Major Research Facilities in the Group:

Microbial Culture Facility, Lyophilizer, Humidity Chamber, Water Bath, Centrifuge, Vacuum Oven, Battery Cycler, UV-VIS Spectrophotometer

Technology/Product Developed:

SthriVIn – A Antifungal & Antibacterial product for intimate wear with Microcapsule formulation



Saswata Bhattacharya

Associate Professor, Materials Simulations Lab

Department of Materials Science & Metallurgical Engineering

Office Room #402; Office Phone: 040-2301-6556; saswata@msme.iith.ac.in;

<https://www.iith.ac.in/msme/saswata/>



Major Areas of Research

Optimization of diffusivities in Ni-base alloys and their influence on Microstructural evolution (SERB)

Development of high-performance phase-field codes (DST-NSM) through Process Modeling of Single crystalline Ni-base superalloy – validation using CMSX-4 (GTMAP)

Major Research Facilities

HPC cluster (Tesla GPUs + InfiniBand)

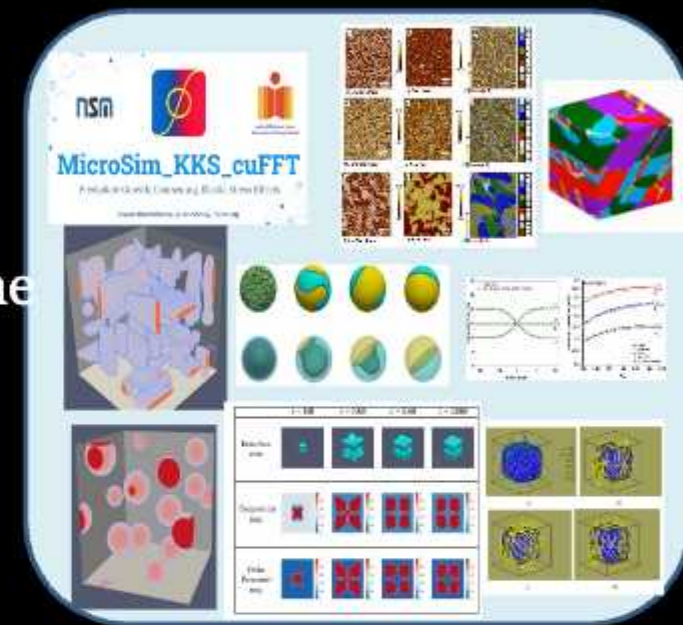
ThermoCalc

Technology/Product Developed/Up to 3 most significant Publications

MicroSim - Open-source HPC software package to simulate microstructural evolution using Phase-field method <https://microsim.co.in/> (Current version: 2.0)

Evolution of Janus, core-shell, and inverse core-shell configurations in bimetallic nanoparticles and morphological stability map – Pankaj, Saswata Bhattacharyya, Subhradeep Chatterjee, Acta Materialia 2022
<https://doi.org/10.1016/j.actamat.2022.117933>

A physics-informed neural network-based numerical inverse method for optimization of diffusion coefficients in NiCoFeCr multi principal element alloy – Hemanth Kumar, Dash, Alope Paul, Saswata Bhattacharyya, Scripta Materialia
<https://doi.org/10.1016/j.scriptamat.2022.114639>



Shourya Dutta Gupta

Assistant Professor, NODe Lab

Department of Materials Science & Metallurgical Engineering

Institute Email: shourya@msme.iith.ac.in; Webpage Link: <https://people.iith.ac.in/shourya>



Major Areas of Research

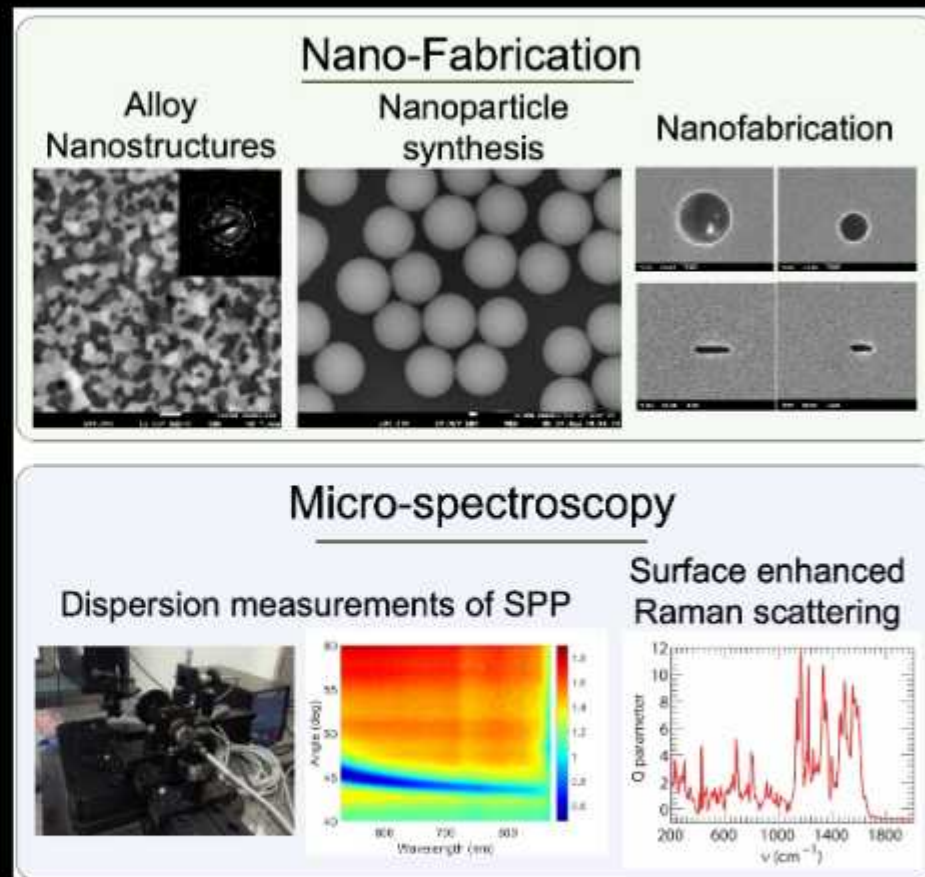
- Plasmonics & Nanophotonics
- Metamaterials & metasurfaces
- Optical Sensors & Modulators

Major Research Facilities in the Group

- Micro-optical spectroscopy (including Raman)
- Magnetron sputtering
- Nanoparticle synthesis & characterization tools

Technology/Product Developed

- Phase separated Ag-Cu thin films for plasmonic applications
- SERS based biosensors using nanoparticle-nanoaperture configuration





Subhradeep Chatterjee

Assistant Professor ,Materials processing and phase transformations lab

Department of Materials Science & Metallurgical Engineering

MSME-301; Office Phone No. NA; subhradeep@msme.iith.ac.in; [Webpage Link](#)

Major Areas of Research/Up to 3 major sponsored projects

Metallurgy of welding and solidification processing

Alloy design and phase transformations

Microstructural characterization and modeling

Major Research Facilities in the Group

Robotic keyhole GTA welding set-up (Fronius ArcTIG)

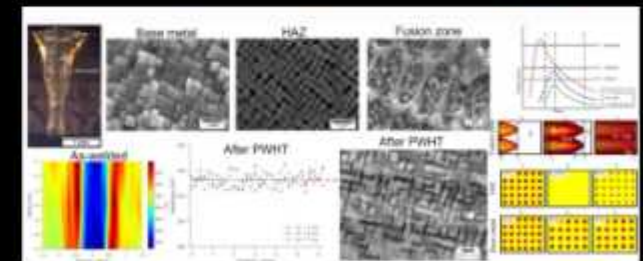


Technology/Product Developed/Up to 3 most significant Publications

Welding and additive manufacturing of superalloys ([link](#))

Alloy design and welding of high entropy alloys ([link](#))

Predicting morphology of bimetallic nanoparticles through phase field simulations ([link 1](#), [link 2](#))



Suhash Ranjan Dey

Professor, Combinatorial Materials Lab,

Department of Materials Science & Metallurgical Engineering

+91 (0)4023016552; +91 7893372422; suhash@msme.iith.ac.in; <http://www.iith.ac.in/~suhash/>



Major Areas of Research

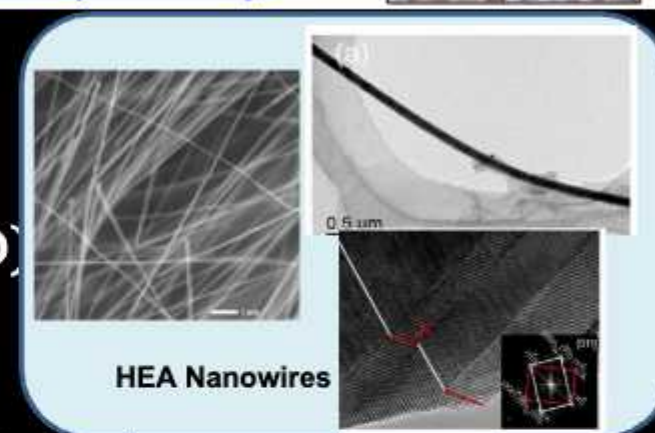
Electrochemical Materials Design & Processing

(High Entropy Alloy Design & Manufacturing (0D, 1D, 2D))

Metals Recovery from Scraps/E-Wastes (Solar PVs, LiBs)

4D Printing of Shape Memory Alloys

Electrochemical Additive Manufacturing Corrosion (cold & hot)



Major Research Facilities in the Group

Electrochemical Setup

Corrosion Setup

Electrochemical Modelling & Simulation

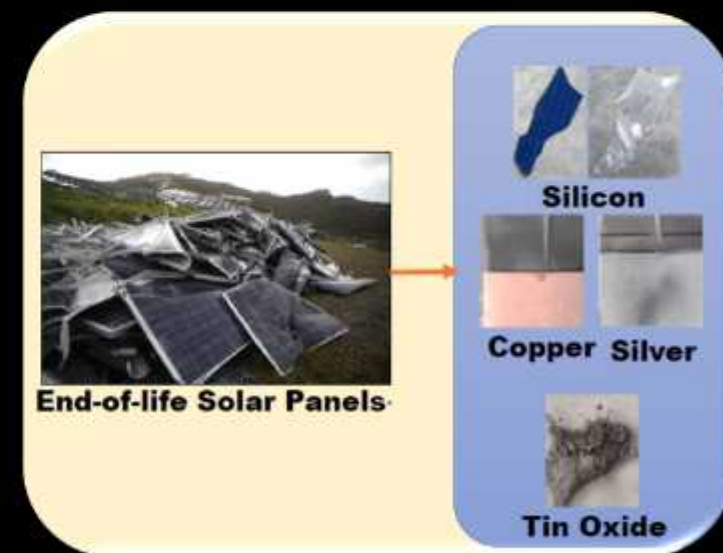
Technology/Product Developed

Anti-viral Coatings on any substrates

High Entropy Alloys Coatings and Nanowires

Sequential Recovery of Critical Metals from E-

Wastes/Scraps



Suresh Kumar Garlapati

Assistant Professor ,Printed Electronics Lab,

Department of Materials Science & Metallurgical Engineering

Office Room No. 307; Mobile: 9100930553; gsuresh@msme.iith.ac.in; <https://msme.iith.ac.in>



Major Areas of Research/Up to 3 major sponsored projects

- printed and flexible electronics, oxide semiconductors, organic electronics, gas sensors, and memristors
- A General route towards low voltage high current power printed electronics (SERB)
- Low-cost sensor technology to detect different biological warfare agents (ATB)

Major Research Facilities in the Group

- Inkjet printer, Ink preparation unit, Hot plates
- Spin coater, Fume hood, Probe station
- Memristor measurement system, Source measurement unit



Technology/Product Developed/Up to 3 most significant Publications

- Garlapati, S. K., et al., (2018). *Advanced Materials*, 30(40), 1707600. [IF: 32.09]
- Garlapati, S. K., et al., (2017). *Advanced Electronic Materials*, 3(9), 1600476. [IF: 7.295]
- Garlapati, S. K., et al., (2015). *Small*, 11(29), 3591-3596. [IF: 15.15]

