

CURRICULUM VITAE

Name: Dr. Sandeep Kumar Sharma

Postdoctoral fellow

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Personal Information:

- **Date of Birth:** November 1st 1989
- **Nationality:** Indian

Academic Qualification:

2019- Present – Postdoctoral Fellow in Polymer Synthesis Lab, Department of Physical Sciences and Engineering, King Abdullah University of Science and Technology (KAUST), Kingdom of Saudi Arabia. Supervisor: Prof. Nikos Hadjichristidis

2013 – 2018: Ph.D. from National Chemical Laboratory under the supervision of Dr. Asha S. K. Thesis title: “**Alternate and Random Copolymers of Bay substituted Rylenebisimides for Energy Applications.**”

2010–2012: M.Sc. in Organic Chemistry (First Class), MGIAS College, Jaipur, Rajasthan, India.

2007–2010: B.Sc. (First Class), S. K. Govt. College, Sikar, Rajasthan, India.

Experimental Skills:

- Strong synthetic hand for the synthesis of semiconducting (donor and acceptor) polymers (side chain and main chain) by various polymerization methods such as controlled free-radical polymerization (ATRP, RAFT, etc.), photopolymerization, polycondensation, direct arylation polycondensation (DAP) etc.
- Experienced in using Schlenk line and high vacuum techniques for polymerization.

- Experience in solar cell device fabrication in glove box and expertise in handling cleanroom facility.
- Worked extensively in the synthesis of supramolecular semiconducting polymers to achieve desired morphology to get better device performance in optoelectronics.
- Worked in the flow synthesis of conjugated polymers for large-scale production of the conjugated polymer.
- Experienced in the synthesis of polymers via anionic polymerization technique.
- Glass blowing technique for preparing polymerization apparatus.
- Expertise in polymer characterization through NMR (^1H , ^{13}C , 2D), FT-IR, HRMS, LC-MS, GPC, DSC, TGA and MALDI-TOF, wide-angle X-ray diffraction (WAXRD) and small-angle X-ray scattering (SAXS), polarized light microscope (PLM). Polymer self-assembly characterization through microscopy techniques such as SEM, TEM, AFM and photo-physical studies such as UV-Visible, Steady State Fluorescence.
- Familiar with MS office packages including MS Word, Powerpoint, Excel, ChemDraw, Origin. Experience in chemical abstracts- SciFinder, Web of Science.

Research Interest:

- Synthesis of multi-functional monomers and study their structure-property relationship.
- Study of supra-molecular donor-acceptor polymers and their applications for various electronic devices like a solar cell, organic field-effect transistor (OFET), etc.
- Synthesis of new n-type polymer composites for energy storage applications.
- Optimization of device fabrication to improve Power Conversion Efficiency (PCE).
- Synthesis of complex macromolecular architectures (cyclic polymers, mechano polymers) via a combination of anionic polymerization and post-modification reactions.

Scientific Publications:

1. “Improved All-Polymer Solar Cell Performance of n-Type Naphthalene Diimide–Bithiophene P(NDI2OD-T2) Copolymer by Incorporation of Perylene Diimide as Co acceptor”
Sandeep Sharma, Nagesh B. Kolhe, Vinay Gupta, Vishal Bharti, Abhishek Sharma, Ram Datt, Suresh Chand, S. K. Asha
Macromolecules **2016**, *49*, 8113–8125.
2. “Naphthalene Diimide Copolymers by Direct Arylation Polycondensation as Highly Stable Supercapacitor Electrode Materials”
Sandeep Sharma, Roby Soni, Sreekumar Kurungot, S. K. Asha

Macromolecules **2018**, *51*, 954–965.

3. “Rylene Diimide-Based Alternate and Random Copolymers for Flexible Supercapacitor Electrode Materials with Exceptional Stability and High Power Density”

Sandeep Sharma, Roby Soni, Sreekumar Kurungot, S. K. Asha

J. Phys. Chem. C **2019**, *123*, 2084–2093.

4. “High Voltage Non-aqueous Supercapacitor Based on N2200 Polymer Supported Over Multi-walled Carbon Nanotube”

Bhaiyyasaheb Anurath Wavhal, Meena Ghosh, **Sandeep Sharma**, Sreekumar Kurungot and S. K. Asha.

Nanoscale **2021**, *13*, 12314-12326.

5. “Well-defined Cyclic Polymers via Efficient Etherification-based Bimolecular Ring-Closure Strategy”

Sandeep Sharma, Konstantinos Ntetsikas, Viko Ladelta, Saibal Bhaumik and Nikos Hadjichristidis

Submitted to Polymer Chemistry

Patents:

1. “Novel Copolymer Compositions for Improved Performance In All-polymer Solar Cells.”
Asha Syamakumari, Nagesh B. Kolhe, **Sandeep Sharma**.

Application number – IN201611023584, 2016 (**Published February 2018**).

2. “Synthesis of Donor and Acceptor Random and Alternate Copolymers for Photovoltaic Application.”

Asha Syamakumari, **Sandeep Sharma**.

Provisional Patent filed. Application number – IN201711018191, 2017.

3. “Naphthalenediimide Copolymers by Direct Arylation Polycondensation as Highly Stable Supercapacitor Electrode Materials.”

Asha Syamakumari, **Sandeep Sharma**, Roby Soni, Sreekumar Kurungot

Provisional Patent filed. Application number – IN201711041441, 2017.