# Brief Biodata

## Name: Dr. Rajiv Kr. Singh

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|---|---|
| **Designation:** | Principal Scientist |
| **DP No. and Name:** | DP#4.01 PV Metrology |
| **DU No. and Name:** | DU #4 Advanced Materials & Devices Metrology |
| **Email**: | rajivsingh@nplindia.org |
| **Date of Joining CSIR-NPL**: | 03/12/2007 |
| **Phone *(office)*** | 011 45608641 |

## Research Area/ Interest

- Organic and Perovskite Photovoltaics Device fabrication and its electrical and dielectric characterization.
- Transient absorption spectroscopy
- Synthesis of conjugated polymers, perovskite and nanomaterials.
- Structural – electrical co-relations characterization & techniques
- Low temperature electrical transport studies: DC and AC conductivities of conjugated polymers, perovskite and organic composites, ferroelectric polymers.
- Plasmonic and meta materials
- Organic Polymers and Processing
- Recycling waste Plastic

## Educational Qualifications

***(Please write latest qualification first)***

| **Degree** | **Subject** | **University/ Institute** | **Year** |
|---|---|---|---|
| M.Sc | Analytical Chemistry | University of Kalyani, West Bengal | 2000 |
| Ph D | Material Science | University of Delhi Jointly CSIR-NPL | 2008 |

## Academic / Research Experience

| **Grade / Post** | **Institute** | **Duration** | | **Research Field** |
|---|---|---|---|---|
| | | **From** | **To** | |
| Gr IV (1) | CSIR-NPL | 03-12-2007 | 02-12-2010 | |
| Gr IV (2) | CSIR-NPL | 03-12-2010 | 02-12-2014 | |

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| Gr. IV (3) | CSIR-NPL | 03-12-2014 | 02-12-2017 | |
| Gr. IV (4) | CSIR-NPL | 03-12-2017 | Till date | |

## No. of Publications

| No. of Publications in SCI Journals | No. of Publications in non-SCI Journals | No. of Publications in Conference Proceedings | Books | Total |
|---|---|---|---|---|
| 70 | 1 | 10 | 2 | 83 |

## Selected Publications

1. Amit Kumar, Aniket Rana, Nikita Vashistha, Kuldeep K. Garg, Mahesh Kumar, Rajiv K Singh; Defect density and performance influenced by ozone treatment of ZnO interface in inverted organic solar cell; Solar Energy.2021 https://doi.org/10.1016/j.solener.2021.07.066 (IF 5.74)
2. Sandeep Pandey, Amit Kumar, Manoj Karakoti, Kuldeep K. Garg, Aniket Rana, Gaurav Tatrari, Bhashkar Singh Bohra, Pankaj Yadav, Rajiv K. Singh, and Nanda Gopal Sahoo; 3D graphene nanosheets from plastic waste for highly efficient HTM free perovskite solar cells; Nanoscale Adv., 2021; https://doi.org/10.1039/D1NA00183C (IF:4.55)
3. Mahak Ahuja, Samya Naqvi, Amit Kumar, Rachana Kumar, Rajiv K. Singh, Sushil Kumar; Efficiency measurement of organic solar cells: Step-by-step protocol to be followed; MAPAN-Journal of Metrology Society of India, 2022; https://doi.org/10.1007/s12647-021-00522-5 (IF:1.05)
4. Aniket Rana, Punit Sharma, Amit Kumar, Saurabh Pareek, Sobia Waheed, Rajiv K. Singh, Supravat Karak; Understanding the Correlation Between Temperature Dependent Performance and Trap Distribution for Nickel Oxide Based Inverted Perovskite solar cell; IEEE Transactions on Electron Devices(2021); https://doi.org/10.1109/TED.2021.3084906 (IF:2.91)
5. Nikita Vashistha, Amit Kumar, Rajiv K. Singh, Mahesh Kumar; Wavelength and decay time of intraband transitions in low spatial frequency laser induced periodic surface structures; Optik: International Journal for light and electron optics, 2021; https://doi.org/10.1016/j.ijleo.2021.167833 (IF: 2.44)
6. S Kumar, K. M. K. Srivatsa, S. Sudhakar, P Singh, P Kumar, R Bhardwaj, Rajiv K Singh, C Kant, S. N. Sharma, V N Singh, P. Pratap, S K Srivastava, Vandana, C. M.

S. Rauthan, A Agarwal, Parag Sharma, V. K. Jaiswal, T. John, D. Shivagan, , and D. K. Aswal, Efficiency Measurement of Organic Solar Cells Using Apex Calibration Facility at CSIR–National Physical Laboratory, Applied Solar Energy, 2021, Vol. 57, No. 4, pp. 261–271, https://doi.org/10.3103/S0003701X21040083, (IF-1.20)

7. Kuldeep K Garg, Sandeep Pandey, Amit Kumar, Aniket Rana, Nanda Gopal Sahoo, Rajiv K Singh; Graphene nanosheets derived from waste plastic for cost-effective thermoelectric applications; Result in Materials. 2022; https://doi.org/10.1016/j.rinma.2022.100260 (IF: 3.6)
8. A. Rana, P. Sharma, A. Kumar, S. Pareek, S. Waheed, Rajiv K. Singh, S. Karak, Understanding the Correlation Between Temperature-Dependent Performance and Trap Distribution for Nickel Oxide Based Inverted Perovskite Solar Cells, IEEETransaction on Electron Devices 2021, https://doi.org/10.1109/TED.2021.3084906 (IF 3.56)
9. S. Pandey, A. Kumar, M. Karakoti, K. K. Garg, A. Rana, G. Tatrari, B. S. Bohra, P. K. Yadav, Rajiv K. Singh, P. Yadav, Nanda Gopal Sahoo, 3D graphene nanosheets from plastic waste for highly efficient HTM free perovskite solar cells, Nanoscale Adv., 2021, https://doi.org/10.1109/TED.2021.3084906 (IF 7.23)
10. A. Kumar, A. Rana, N. Vashistha, K. K. Garg, Rajiv K. Singh, Defect states influencing hysteresis and performance of perovskite solar cells, Solar Energy, 211, 345-353, 2020, https://doi.org/10.1016/j.solener.2020.09.052 (IF 5.74)

**Patents ; 2**

P-Toluenesulfonate Doped Polypyrrole/Carbon Composite Electrode And A Process For The Preparation Thereof US10,074,453 B2,

"3, 4-Ethylenedioxythiophene-based materials, their electropolymerization as hole-transport layer in plastic solar cells" 0108NF2016-US

**Current Activities**

***(Not more than 100 words)***

Design & development of the flexible large area (156x156 $mm^2$) modified perovskite mini modules DST Project under this large area (156x156 mm2) fabrication of device will take place with doctor-blade coating method on a flexible substrate with an efficiency of 15-18% will be achieved using various modified perovskite material and interface engineering. This project will target various aspects of increasing the device's self-life desired for commercialization, such as stable absorber, interface engineering, and encapsulation.
To successfully transition PSC technology from the laboratory to the industrial scale, substantial efforts need to focus on the scalable fabrication of high-performance perovskite

modules with minimum negative environmental impact. Here, is a project proposal of PSC technology for future large-scale manufacturing and deployment. Several key challenges which will be addressed are (1) a scalable process for large-area perovskite module fabrication; (2) less hazardous chemical routes for PSC fabrication; and (3) suitable perovskite mini-module designs for commercial applications.

Recycling of Waste Plastic into Tiles for fabricating structures for Societal Usage: Technology transfers to seven industries

Testing Facility for Surgical Gowns (PPE)- Water Vapour Transmission Rate (WVTR, the standard system as per ASTM D6701

Development of prefabricated plastic panels for road construction-

Developing indigenous technology for "Development of Polystyrene Films" standard BND-2004 for calibration of the wavelength of FT-IR spectroscopy

**Honour(s)/Award(s)/ Fellowship(s)**

CSIR-Raman Research fellow 2016

**Contributions to AcSIR**

Subject/Course
Course Co-ordinator CHE (NPL)-1-4601: Research Methodology, Scientific Writing & communication Skill (Compulsory)

CHE (NPL)-3-4621: Advanced Polymer Science and Technology:
Total Phd Awarded: 5

**Membership of Professional Societies/ Institutions**

MRSI- Life time member

**Any other Information**
***(Not more than 100 words)***