

Dr. Ranbir Singh (Ph.D., M.Tech.)

Assistant Professor

School of Mechanical and Materials Engineering (SMME),

Indian Institute of Technology Mandi (IIT-Mandi),

Mandi, Himachal Pradesh, 175075, India.

Mobile: (+91) 8894639383

Email: ranbir@iitmandi.ac.in



Summary

Demonstrated working history in academic and research institutions in India, South Korea, and Italy. Strong research and teaching experience in inorganic, organic, and perovskite material-based devices such as Light Emitting Diodes (LEDs), Solar cells, Photodetectors, Piezoelectric, Electronic Skin (E-Skin) sensors, etc. with works published in top journals/conferences. Hands-on experience in developing prototype displays and photovoltaic panels.

Employment and experience:

- 2022-Present: **Assistant Professor**, School of Mechanical and Materials Engineering (SMME), Indian Institute of Technology Mandi (IIT-Mandi), Mandi, H.P., 175075, India; Email) ranbir@iitmandi.ac.in
- 2021 - 2022 **Ramanujan Fellow (SERB-DST)**, School of Computing and Electrical Engineering (SCEE), Indian Institute of Technology Mandi (IIT-Mandi), Mandi, Himachal Pradesh, 175075, India.
Research Experience: Piezoelectric Nanogenerators (PENG), Triboelectric Nanogenerators Electronic-skin (E-skin) Sensors, Thin Film based Photovoltaics (Perovskite and organics).
- 2018- 2021 **Assistant Professor**, Department of energy and materials engineering, Dongguk University, Republic of Korea
Research Experience: Working on organic and perovskite materials-based Photovoltaics, Photodetector, and E-skin.
- 2015 –2018 **POSTDOC**, Pohang University of Science and Technology (POSTECH), Korea.
Research Experience: non-fullerene OPVs and Perovskite solar cell
- 2013 –2014 Researcher, Centre for Nano Science and Technology (CNST) @IIT, Italy,
Research Experience: high bandgap polymer for OPVs
- 2008 - 2011 **Research Scientist @SCDT, IIT Kanpur**, R&D unit of the company “Samtel Colour Ltd, India”.
Research Experience: worked on Project “Developing PMOLED and AMOLED displays for Mobile applications”.

Education

- 2011 - 2014 **Ph.D. in Physics (CNST@IIT, Politecnico di Milano, Italy; QS World Ranking - 142)**
Supervisor: Prof. Guglielmo Lanzani and Panagiotis E. Keivanidis
Thesis: Device Engineering of Solution-processed Inverted Organic Solar Cell for Perylene Diimide-based Non-fullerene Acceptor.
- 2005 - 2007 **M. Tech. in Material Science and Engineering (IIT Kanpur, India; QS World Ranking – 277);** Supervisors: Prof. Monica Katiyar and Prof. Deepak Gupta
Thesis: Effect of processing on ultraviolet and white emission from poly(n-butylphenylsilane) based Organic light-emitting diodes.
- 2002 - 2004 **Master of Science - Physics (G.N.D. University, India)**
- 1999 - 2002 **Bachelor of Science (H.P. University, India)**

Prizes and Awards

- Ramanujan Fellow, IIT Mandi, 2021
- Young Researcher Award, 2021.
- Best Poster Award (1st), Nanocrystalline perovskite powder for an efficient and hysteresis-free perovskite solar cell under ambient conditions, New Delhi, ESPGEH, 2019.
- Ph.D. scholarship awarded by Politecnico di Milano for 3 years (2011-2014).
- Qualified for Graduate Aptitude Test in Engineering (GATE), conducted by Ministry of Human Resource and Development, India. (Score – 96.34)
- Qualified for Joint Entrance Screening Test (JEST), (Score – 98.7)
- MHRD Scholarship for master's in technology at IIT Kanpur, India (2005-2007).
- One-time cash award for publication in a journal listed in ISI web of science by Dean Resource Planning and Generation (DRPG) IIT Kanpur India.
- Recognition received after reviewing Journal papers such as ACS Energy letter, Journal of Materials Chemistry A, Solar Energy, ACS Applied Materials and Interfaces, ACS Applied Energy Materials, etc

Invited Talks:

- NITTTR, Chandigarh, Topic: Solar energy materials and technology, 02.12.2021.
- PVSEC, South Korea, Indoor Photovoltaic for Powering Internet of Things (IoTs), 2021.
- Workshop on Organic/Perovskite Photovoltaics, Dongguk University, 2020.
- UK-Korea, Electronic Materials Workshop at POSTECH University, 2018.

List of Publications

Peer-reviewed scientific journals

(Citations – 2827; h-index = 28 ; i10-index – 59):

In brief: 45 1st authorship paper and corresponding; 36 in co-authors. 7 papers > IF 20, 15 papers > IF 10, 29 papers > IF 5, 2 Book chapters, 9 conference papers.

1. Bandgap Engineered Double-Cation/Double-halide (DCDH) Quasi-Cubic Perovskite for Highly Efficient (> 36%) Indoor Photovoltaics, **Ranbir Singh**, Milon Kundar, Suman Kalyan Pal, Satinder K. Sharma, 2023 (Under Review in Journal of Photovoltaics IEEE)
2. Surface Passivation by Sulfur-based 2D (TEA)2PbI4 for Highly Stable and Efficient Perovskite Solar Cells, Milon Kundar, Sahil Bhandari, Sein Chung, Kilwon Cho, Satinder K. Sharma, Ranbir Singh*, Suman Kalyan Pal*, ACS Omega, 2023. DOI: doi.org/10.1021/acsomega.2c08126
3. Highly Efficient Bifacial Perovskite Photovoltaics for Harvesting Energy from Artificial LED Indoor Light Source, **Ranbir Singh***, Pankaj Kumar, Sumit Chaudhary, Vikrant Sharma, Satinder Kumar Sharma, Journal of Material Chemistry A, 2023. **(IF - 14.51)**
Under review
4. Perovskite-based Photovoltaics for Artificial Indoor Light Harvesting: A Critical Review, Ranbir Singh, Mohammed Nazim, Gururaj P. Kini, Zhipeng Kan, Accepted Solar RRL, 2022. **(IF- 9.1)**
5. Highly efficient quasi-cubic structured perovskite for harvesting energy from artificial indoor LED light source, Ranbir Singh*, Mritunjaya Parashar, Vivek Kumar Shukla, Satinder K. Sharma, **Solar Energy**, **245**, 332-339, **2022 (IF- 7.2)**
6. Studies on the ZnCl₂ activated carbons derived from Sabal palmetto and Pterospermum acerifolium leaves for EDLC application, Komal, **Ranbir Singh**, V. G. Parale, V. K. Shukla, Biomass Conversion and Biorefinery, 2022. (DOI: [10.1007/s13399-022-03088-7](https://doi.org/10.1007/s13399-022-03088-7)) **(IF- 4.99)**

7. T. Ye, Q. Wang, C. Tian, **R. Singh**, Y. Zhang, Z. Liu, X. Fang, Dongqing He, Multifunctional Electronic Skin based on Perovskite Intermediate Gels, *Adv. Electron. Mater.* 1901291, 2020. **(IF =7.29)**
8. Perovskite-based Photovoltaics for Artificial Indoor Light Harvesting: A Critical Review, Ranbir Singh, Mohammed Nazim, Gururaj P. Kini, Zhipeng Kan, *Accepted Solar RRL*, 2022. **(IF- 9.1)**
9. J Lv, H Tang, J Huang, C Yan, K Liu, Q Yang, D Hu, **R Singh**, J Lee, S Lu, Additive-induced miscibility regulation and hierarchical morphology enable 17.5% binary organic solar cells, *Energy & Environmental Science* 14 (5), 3044-3052, 2021. **(IF = 38.53)**
10. Zihui Liao, Dingqin Hu, Hua Tang, Peihao Huang, **Ranbir Singh**, Sein Chung, Kilwon Cho, Manish Kumar, Hou Licheng, Gang Li, Shirong Lu, 18.42% efficiency polymer solar cells enabled by terpolymer donors with optimal miscibility and energy levels, *Journal of Materials Chemistry A*, 10, 7878-7887, 2022. **(IF = 12.7)**
11. G. P. Kini, Mritunjaya Parashar, Muhammad Jahandar, Jaewon Lee, Vivek Kumar Shukla, and **Ranbir Singh***, Structure-property relationships of Diketopyrrolopyrrole and Thienoacene based A-D-A type hole transport materials for efficient perovskite solar cells, *New Journal of Chemistry*, 2022 **(Accepted)**. **(IF = 3.6)**
12. M. Rahman, C.-Y. Ge, **R. Singh**, K. Yoo, S. Sandhu, S. Kim, and J.-J. Lee, Trimethylsulfonium Lead Triiodide (TMSPbI₃) For Moisture-Stable Perovskite Solar Cells, *Sustainable Energy & Fuels*, 5, 4327-4335, 2021. **(IF = 6.04)**
13. D Hu, Q Yang, Y Zheng, H Tang, S Chung, **R Singh**, J Lv, J Fu, Z Kan, S. Lu, 15.3% Efficiency All-Small-Molecule Organic Solar Cells Achieved by a Locally Asymmetric F, Cl Disubstitution Strategy, *Advanced Science* 8 (8), 2004262, 2021. **(IF =16.8)**
14. G. P. Kini, M. Parashar, V. K. Shukla, **R. Singh*** Deciphering the effect of replacing thiophene with selenophene in the diketopyrrolopyrrole (DPP)-based hole transport materials on the performance of perovskite solar cells, *Sustainable Energy & Fuels*, 5, 5994-6003 2021**(IF = 6.04)**
15. J Lv, H Tang, J Huang, C Yan, K Liu, Q Yang, D Hu, **R Singh**, J Lee, S Lu, Additive-induced miscibility regulation and hierarchical morphology enable 17.5% binary organic solar cells, *Energy & Environmental Science* 14 (5), 3044-3052, 2021. **(IF = 38.53)**
16. SY Ko,^a **R Singh**,^a B Nketia-Yawson, H Ahn, JW Jo, JJ Lee, MJ Ko, Modulation of energy levels and vertical charge transport in polythiophene through copolymerization of non-fluorinated and fluorinated units for organic indoor photovoltaics, *Dyes and Pigments* 190, 109292, 2021. **(IF = 4.7)**
17. **R Singh**, M Parashar, S Sandhu, K Yoo, JJ Lee, The effects of crystal structure on the photovoltaic performance of perovskite solar cells under ambient indoor illumination, *Solar Energy* 220, 43-50, 2021. **(IF =4.7)**
18. S Sandhu,^a **R Singh**,^a K Yoo, M Kumar, JJ Lee, Effect of binary additives in mixed 2D/3D Sn-based perovskite solar cells, *Journal of Power Sources* 491, 229574, 2021. **(IF = 8.27)**
19. M Parashar,^a **R Singh**,^a K Yoo, JJ Lee, Formation of 1-D/3-D Fused Perovskite for Efficient and Moisture Stable Solar Cells, *ACS Applied Energy Materials* 4 (3), 2751-2760, 2021. **(IF = 5.77)**
20. A Sharma, ^a **R Singh**, ^a ,* GP Kini, J Hyeon Kim, M Parashar, M Kim, M Kumar, Side-Chain Engineering of Diketopyrrolopyrrole-Based Hole-Transport Materials to Realize High-Efficiency Perovskite Solar Cells, *ACS Applied Materials & Interfaces* 13 (6), 7405-7415, 2021. **(IF = 9.22)**
21. L Hou, J Lv, F Wobben, VM Le Corre, H Tang, **R Singh**, M Kim, F Wang, Effects of Fluorination on Fused Ring Electron Acceptor for Active Layer Morphology, Exciton Dissociation, and Charge Recombination in Organic Solar Cells, *ACS Applied Materials & Interfaces*, 12, 3, 2021. **(IF = 9.22)**

22. Z Liao, K Yang, L Hou, J Li, J Lv, **R Singh**, M Kumar, Q Chen, X Dong, Thiazole-Functionalized Terpolymer Donors Obtained via Random Ternary Copolymerization for High-Performance Polymer Solar Cells, *Macromolecules*, 53 (20), 9034-9042, 2020. (IF = 5.91)
23. J Lee, **R. Singh***, Competitive role between conformational lock and steric hindrance in DA copolymers containing 1, 4-bis (thieno [3, 2-b] thiophen-2-yl) benzene unit, *Dyes and Pigments* 181, 108540, 2021. (IF = 4.7)
24. H Tang, H Chen, C Yan, J Huang, PWK Fong, J Lv, D Hu, **R Singh**, Delicate morphology control triggers 14.7% efficiency all-small-molecule organic solar cells, *Advanced Energy Materials* 10 (27), 2001076, 2020. (IF = 29.37)
25. Tongle Xu, Yuying Chang, Cenqi Yan, Qianguang Yang, Tainan Duan,* Zhipeng Kan, **Ranbir Singh**,* Manish Kumar, and Shirong Lu*, Fluorinated Oligothiophene Donor for High-Performance Nonfullerene Organic Photovoltaics, *Sustainable Energy & Fuels* 4 (6), 2680-2685, 2020. . (IF = 6.04)
26. Q. Yang, H. Chen, N. Haiyan, F. Friso C. Le, V. Corre, **R. Singh**, H. Tang, L.A.J. Koster, 15.34% Efficiency All-Small-Molecule Organic Solar Cells with Improved Fill Factor Enabled by a Fullerene Additive, *Energy & Environmental Science* 13 (7), 2134-2141, 2020. . (IF = 38.53)
27. T. Ye, S. Jin, **R. Singh**, W. Chen, W. Li, D. He, Effects of Solvent Additives on the Morphology and Transport Properties of Perylene Diimide Dimer as an Effective Electron Transport Layer for p-i-n Planar Perovskite Solar Cells, *Solar Energy* 201, 927-934, 2020. . (IF = 4.7)
28. S. Rechberger, N. Gasparini, **R. Singh**, M. Kim, C. L. Chochos, C. J. Brabec, K. Cho, T. Ameri, E. Spiecker Unraveling the Complex Nanomorphology of Ternary Organic Solar Cells with Multimodal Analytical Transmission Electron Microscopy, *Solar RRL* 4 (6), 2000114,2020. . (IF = 7.52)
29. T. Duan, J. Gao, T. Xu, Z. Kan, **R. Singh***, G. P. Kini, C. Zhong, D. Yu, Z. Xiao, S. Lu*, Simple Organic Donors Based on Halogenated Oligothiophenes for All Small Molecule Solar Cells with Efficiency Over 11%, *Journal of Mater. Chem. A*, 2020,8, 5843-5847 , 2020. . (IF =11.3)
30. T. Ye, Q. Wang, C. Tian, **R. Singh**, Y. Zhang, Z. Liu, X. Fang, Dongqing He, Multifunctional Electronic Skin based on Perovskite Intermediate Gels, *Adv. Electron. Mater.* 1901291, 2020. . (IF =7.29)
31. M. Parashar1, V. K. Shukla, **R. Singh***, Metal Oxides Nanoparticles via Sol-Gel Method: A Review on Synthesis, Characterization and Applications, *Journal of Materials Science: Materials in Electronics*, 1-21, 2020. (IF = 2.19)
32. T. Duan, J. Gao, M. Babics, Z. Kan, C. Zhong, **R. Singh**, D. Yu, J. Lee, Z. Xiao, S. Lu, Difluorinated Oligothiophenes for High-Efficiency All-Small-Molecule Organic Solar Cells: Positional Isomeric Effect of Fluorine Substitution on Performance Variations, *Solar RRL*, 1900472 (1-10), 2020. . (IF = 7.29)
33. **R. Singh**, M. Kim, J.-J. Lee, T. Ye, P. E Keivanidis, K. Cho, Excimer Formation Effects and Trap-assisted Charge Recombination Loss Channels in Organic Solar Cells of Perylene Diimide Dimer Acceptors, *J. Mater. Chem. C*, 8, 1686-1696, 2020. . (IF = 7.06)
34. G. P. Kini,1 S. R. Suranagi, M. Kumar, **R. Singh**, A systematic evaluation of the effects of triisopropylsilylethynyl-substituted thienyl side chains on benzo[1,2-b:4,5-b']dithiophene based series of polymer donors and their photovoltaic performances, *Dyes and Pigments*, 175, 108083 (1-9), 2020. . (IF = 4.7)
35. Jie Lv, Y. Feng, J. Gao, J. Fu, **R. Singh**, M. Kumar, M. Kim, H. Tang, S. Lu, W. Zhang, I. McCulloch, J. Li, Z. Kan, Energetic Disorder and Activation Energy in Efficient Ternary Organic Solar Cells with Nonfullerene Acceptor Eh-IDTBR as the Third Component, *Solar RRL*, 1900403 (1-8) 2019. (IF = 7.29)

36. **R. Singh**, S. Sandhu, J.-J. Lee, Elucidating the Effect of Shunt Losses on the Performance of Mesoporous Perovskite Solar Cells, *Solar Energy*, 193,15, 956-961, 2019. **(IF = 4.89)**
37. H. Tang, T. Xu, **R. Singh**, M. Kumar, T. Duan, Z. Kan, * S. Lu, and G. Li, Donor Derivative Incorporation – An Effective Strategy Towards High Performance All-Small-Molecule Ternary Organic Solar Cells, *Adv. Sci.*, 6, 21, 1901613 (1-8), 2019. **(IF-15.81)**
38. **R. Singh**, C. L. Chochos, M. Kim, S. H. Kim, J. W. Shim, J.-J. Lee, Highly Efficient Indoor Organic Solar Cells by Voltage Loss Minimization through Fine-Tuning of Polymer Structures, *ACS applied material & interfaces*, 11, 40, 36905-36916, 2019. **(IF-8.56)**
39. **R. Singh**, S. Sandhu, H. Yadav J. -J. Lee, A Stable Triple-Cation (Cs⁺-MA⁺-FA⁺) Perovskite Powder Formation Under Ambient Conditions for a Hysteresis-Free High Efficiency Solar Cells, *ACS Appl. Mater. Interfaces*, 11, 33, 29941-29949 2019. **(IF-8.56)**
40. **R. Singh**, I. Ryu, H. Yadav, J. Park, J. W. Jo, S. Yim, J. J. Lee, Non-hydrolytic sol-gel route to synthesize TiO₂ nanoparticles under ambient condition for highly efficient and stable perovskite solar cells, *Solar energy*, 185, 307-314, 2019. **(IF-4.89)**
41. **R. Singh**, A. Giri, M. Pal, K. Thiyagarajan, J. Kwak, J.-J. Lee, U. Jeong and K. Cho, Perovskite solar cells with an MoS₂ electron transport layer, *J. Mater. Chem. A*, 7, 7151-7158, 2019. **(IF = 10.73)**
42. **R. Singh***, V. K. Shukla, ITIC-based bulk heterojunction perovskite film boosting the power conversion efficiency and stability of the perovskite solar cell, *Solar Energy*, 178, 90-97, 2019 **(IF-4.89)**
43. S. R. Suranagi, Min Kim, **R. Singh**, * Enhancing the power conversion of the perovskite solar cells via structural tuning of BTT(DPP)3-based low bandgap hole transporting material, *Dyes and Pigments*, 163, 525-532, 2019 **(IF-4.01)**.
44. T. Duan, H. Tang, Z. Kan, **R. Singh**, M. Kumar, Z. Xiao, S. Lu, F. Laquai, Terminal group engineering for small-molecule donors boosts the performance of nonfullerene organic solar cells, *J. Mater. Chem. A*, 2019, 7, 2541-2546. **(IF = 10.73)**
45. **R. Singh**, V. K. Shukla, Impact of selective reflectance in a microcavity-based organic light-emitting diode, *Indian Journal of Physics*, 93, 3, 343–347, 2019. **(IF-1.29)**
46. **R. Singh**, Hansol Lee, Min Kim, Sang-Chul Shin, Jae Won Shim, Kilwon Cho, Jae-Joon Lee, Ternary blend strategy for achieving high-efficiency organic photovoltaic devices for indoor applications *Chem. Eur. J.* 25, 6154 –6161, 2019 **(IF=5.16)**
47. **R. Singh**, * Manish Kumar, Vivek Kumar Shukla*, Improved performance and stability of perovskite planar heterojunction solar cell via small molecule doping, *Journal of Electronic Materials*, 47 (11), 6894-6900, 2018. **(IF-1.9)**
48. **R. Singh**, S. R. Suranagi, S. Joo, K. Cho, “Enhancing the power conversion efficiency of perovskite solar cells via the controlled growth of perovskite nanowires” *Nano Energy*, 51, 192-198, 2018. **(IF- 15.46)**
49. A. Giri, J. Kwak, M. Pal, **R. Singh**, D. Lee, C. Kim, K. Cho, U. Jeong, “Synthesis of Atomically Thin MoTe₂ and WTe₂ Films by Rapid Chemical Transformation in Solution Phase” *Chemistry of Materials* 30 (7), 2463-2473, 2018. **(IF-10.16)**
50. S. R. Suranagi[†], **R. Singh**[†], Joohyun Kim, Min Kim, Kilwon Cho, “Molecular Engineering of Perylenediimides Based Polymer Acceptors for All Polymers Solar Cells” *Organic Electronics* 58, 222-230, 2018. **(IF-3.5)**
51. **R. Singh**, S. R. Suranagi, J. Lee, H. Lee, M. Kim, Kilwon Cho, “Unravelling the efficiency-limiting morphological issues of the perylene diimide-based non-fullerene organic solar cells” *Scientific reports Nature* 8 (1), 2849, 2018. **(IF-4.4)**

52. C. Chochos, **R. Singh**, V. G. Gregoriou, M. Kim, A. Katsouras, E. Serpetzoglou, I. Konidakis, E. Stratakis, K. Cho, and A. Avgeropoulos, "Enhancement the Power Conversion Efficiency of Organic Solar Cells via Unveiling the Appropriate Rational Design Strategy in Indacenodithiophene-alt-Quinoxaline π -Conjugated Polymers, ACS Applied Materials & Interfaces, 10, 10236–10245, 2018. (IF-8.54)
53. **R. Singh***, S. R. Suranagi, M. Kumar, V. K. Shukla, "Investigations on the role of mixed-solvent for improved efficiency in perovskite solar cell "Journal of Applied Physics, 122, 235302 (2017). (IF-2.32)
54. A. Giri, H. Yang, K. Thiagarajan, **R. Singh**, K. Cho, U. Jeong, "One-Step Solution Phase Growth of Transition Metal Dichalcogenide Thin Films Directly on Solid Substrates" Adv. Mater., 2017, 29, 1700291 (IF= 25.81)
55. **R. Singh**, J. Lee, M. Kim, P. E. Keivanidis, K. Cho, "Control of the molecular geometry and nanoscale morphology in perylene diimide based bulk heterojunctions enables an efficient non-fullerene organic solar cell" J. Mater. Chem. A, 5, 210-220, 2017. (IF = 10.74)
56. K. C. Song[‡], **R. Singh[‡]**, J. Lee[‡], D. H. Sin, H. Lee and K. Cho," Propeller-shaped small molecule acceptors containing a 9,9'-spirobifluorene core with imide-linked perylene diimides for non-fullerene organic solar cells" J. Mater. Chem. C, 4, 10610-10615, 2016. (IF = 5.4)
57. C.L. Chochos*, **R. Singh***, M. Kim, N. Gasparini, A. Katsouras, V. G. Gregoriou, P. E. Keivanidis, T. Ameri, C. J. Brabec, K. Cho, A. Avgeropoulos," Enhancement of the Power Conversion Efficiency in Organic Photovoltaics by Unveiling the Appropriate Polymer Backbone Enlargement Approach" Adv. Funct. Mater. 26, 1840, 2016. (IF= 15.62)
58. J. Lee[†], **R. Singh[†]**, D. H. Sin, H. G. Kim, K. C. Song, K. Cho," A Non-Fullerene Small Molecular Acceptor with Three-Dimensional Interlocking Geometry Enabling Efficient Organic Solar Cells" Adv. Mater. 28, 69-76, 2016. (†equally contributed) (IF= 25.81)
59. B. Sharma, Y. Sarothia, **R. Singh**, Z. Kan, P. E. Keivanidis, J. Jacob," Synthesis and characterization of light-absorbing cyclopentadithiophene-based donor-acceptor copolymers" Polym. Int., 65, 57-65, 2016. (IF= 2.45)
60. **R. Singh**, R. Shivanna, A. Iosifidis, H.-J. Butt, G. Floudas, K. S. Narayan, P. E. Keivanidis," Charge versus Energy Transfer Effects in High-Performance Perylene Diimide Photovoltaic Blend Films" ACS Appl. Mater. Interfaces. 7, 24876, 2015. (IF= 8.54)
61. E. Aluicio-Sarduy, **R. Singh**, Z. Kan, T. Ye, A. Baidak, A. Calloni, G. Berti, L. Duo, A. Iosifidis, S. Beaupre, M. Leclerc, H.-J. Butt, G. Floudas, P. E. Keivanidis," Elucidating the Impact of Molecular Packing and Device Architecture on the Performance of Nanostructured Perylene Diimide Solar Cells" Appl. Mater. Interfaces, 2015, 7, 8687- 8698. (IF= 8.54)
62. **R. Singh**, G. Pagona, V. G. Gregoriou, N. Tagmatarchis, D.Toliopoulos, Yang Han, Z. Fei, A. Katsouras, A. Avgeropoulos, T. D. Anthopoulos, M. Heeney, P. E. Keivanidis, C. L. Chochos, "The impact of thienothiophene isomeric structures on the optoelectronic properties and photovoltaic performance in quinoxaline based donor-acceptor copolymers" Polym. Chem. 6, 3098-3109, 2015. (IF= 5.69)

63. **R. Singh**, Eduardo Aulicio-Sardui, Zhipeng Kan, Tengling Ye, Panagiotis E. Keivanidis," Fullerene-free organic solar cells with an efficiency of 3.7% based on a low-cost geometrically planar perylene diimide monomer" *J. Mater. Chem. A*, 2, 14348, 2014. (IF= 10.74)
64. **R. Singh**, E. Giussani, F. D. Fonzo, D. Fazzi, M.M. Mróz, J. C.-Gonzalez, P. Ceroni, K.Mullen, J. Jacob, A. G. Kontos, V. Licodimos, P. Falaras, P. E. Keivanidis," On the role of aggregation effects in the performance of perylene-diimide based solar cells" *Organic Electronics*, 15, 1347, 2014. (IF= 3.5)
65. T. Ye, **R. Singh**, H.-J. Butt, G. Floudas, P. E. Keivanidis," Effect of local and global structural order on the efficiency of perylene diimide excimeric solar cells" *ACS Appl. Mater. Interfaces* 5, 11844- 11857, 2013. (IF= 8.54)
66. **R. Singh**, Marta M. Mróz, Fabio Di Fonzo, J. C.-Gonzalez, K. Müllen, J. Jacob, P. E. Keivanidis," Improving the layer morphology of solution-processed perylene diimide organic solar cells with the use of a polymeric interlayer" *Org. Photonics and Photovoltaics*, 1, 24, 2299, 2013. (IF=...)
67. P. K. Uttwani, B. C. Villari, K. N. N. Unni, **R. Singh**, Asha Awasthi and Deepak," Detection of physical defects in full color passive matrix OLED display by image driving techniques" *IEEE Journal of Display Technology*, 8, 3, 2012. (IF= 1.92)
68. **R. Singh**, K. N. N. Unni, A. Solanki, Deepak," Improving the contrast ratio of OLED displays: an analysis of various techniques." *Optical Materials* 34, 34, 4, 716, 2012. (IF= 2.69)
69. **R. Singh**, Monica Katiyar," Effect of Pixellization on Efficiency and Stability of MEH-PPV based Polymer Light Emitting Diodes" *J. of Encap. and Ads. Sci.*, 2, 11, 2012. (IF=1.38)
70. **R. Singh**, M. Katiyar," Polysilane based ultraviolet light emitting diodes with improved turn-on voltage and colour purity" *Synthetic Metals*, 160, 189, 2010. (Citations =12, IF=2.87)
71. G. Saikia, **R. Singh**, P. J. Sarmah, M. W. Akhtar, J. Sinha, M. Katiyar, P. K. Iyer," Synthesis and Characterization of Soluble Poly(p-phenylene) Derivatives for PLED applications" *Macro. Chem. and Phys.*, 210, 24, 2153, 2009. (IF= 2.61)
72. V. K. Shukla, M.a Parashar, **Ranbir Singh**, Fabrication of Perovskite Solar Cells in Ambient Conditions, Conference on Science and Engineering of Materials, Material Today Proceedings, 2019.
73. V. K. Shukla, K. Bainsla, N. Kumar, P. K. Singh, **Ranbir Singh**, 'KUSHA' (ERAGROSTIS CYNOSUROIDES): A source of activated carbon for energy storage devices, Conference on Science and Engineering of Materials, Material Today Proceedings, 2019.
74. **R. Singh***, S. R. Suranagi, M. Kumar, V. K. Shukla, "Dual effect of solvent mixing in preparing perovskite solar cell: improving film morphology and reduce the recombination rate" IWPSD conference proceeding, 2017.
75. **R. Singh**, V.K. Shukla, "Planar versus bulk heterojunction perovskite microstructures: Impact of morphology on photovoltaic properties and recombination dynamics" *AIP*, 1953 (1), 060033, 2018.
76. **R. Singh**, A. Sharma, D. Gupta and M. Katiyar," Effect of the bilayer cathode on white and ultraviolet emission in polysilane based light emitting diodes" *IEEE*, 978-1-4244-1728-5/07, 2007.

77. **R. Singh**, M. Katiyar, “Effect of thermal annealing on the performance of polysilane based organic light emitting diode”1091E, paper- 1091-AA07-48, MRS, 2008.
78. G. Saikia, **R. Singh**, M. Katiyar, P. K. Iyer, “Synthesis, characterization, and OLED fabrication studies with polyfluorene copolymers for pure blue emission” ICAMR, Dubai, UAE, 2013 (Proceedings of Advanced Materials Research Journal (ISSN: 1022-6680)).
79. R. K. Sharma, **R. Singh**, Deepak, M. Katiyar, A. Sharma,” Improvement in micro-lens array and its fabrication for light out-coupling from OLED displays and lighting sources” E-MRS, May 14-18, 2012.
80. V. K. Shukla, **R. Singh**, “Selective surface treatments for commercial conducting oxides used in fabricating defect free organic displays.”1536, 585, 2013 American Institute of Physics (AIP).
81. V. K. Shukla, **R. Singh**,” Thin film and optical properties of Perovskite material for Solar cell” American Institute of Physics (AIP) proceeding, 2016.

Book Chapters

1. **Book Chapter: Book Chapter:** Origin of Hysteresis in Perovskite Solar Cells, in Soft-Matter Thin Film Solar Cells: Physical Processes and Device Simulation, R. **Singh**, M. J. Parashar, AIP Publishing, 2021.
2. **Book Chapter: The Physics of Semiconductor Devices, R. Singh**, S. R. Suranagi, M. Kumar, V. K. Shukla, Mixed solvent engineering to optimize morphology and optical properties of perovskite thin films for an efficient solar cell, Springer Nature Switzerland AG, 309-313, 2019 (DOI: 10.1007/978-3-319-97604-4_47).

Patents

1. A Novel Bifacial Perovskite Photovoltaic Architecture for Harvesting Energy from Artificial Indoor LED Light Sources (App. N. - **202211063783**), 2022. 2. Perovskite Ink for Optoelectronic Application (*In Process*)

International Conferences:

1. **R. Singh**, Sanjay Sandhu, Hemraj Yadav, and Jae-Joon Lee, Nanocrystalline perovskite powder for an efficient and hysteresis-free perovskite solar cell under ambient conditions, 12th – 14th February, New Delhi, ESPGEH, 2019. (1st Best Poster)
2. **R.Singh**, Ilhwan Ryu and Jae-Joon Lee*, Low-temperature processed tin oxide nanoparticle for efficient perovskite solar cells under ambient condition, Nov. 15-17, K-J PV, 2018
3. **R. Singh**, Next generation photovoltaic techniques including Si, CGIS, Perovskite and Dye-sensitized solar cell, SISF, (The 7th Sungkyun International Solar Forum), June 27-29th, 2018
4. **R. Singh**, V.K. Shukla, “Planar versus bulk heterojunction perovskite microstructures: Impact of morphology on photovoltaic properties and recombination dynamics” ICC Bikaner, India, Nov. 24-25, 2017.
5. V. K. Shukla, **R. Singh**,” Thin film and optical properties of Perovskite material for Solar cell” ICANN, New Delhi, India, Nov. 4-5, 2016.
6. Rahul K Sharma, **R. Singh**, Deepak, Monica Katiyar,” Improvement in micro-lens array and its fabrication for light out-coupling from OLED displays and lighting sources” International Symposium on Functional Materials (ISFM), OIST, Okinawa, Japan, 2016.

7. C. P. Yau, Z. Fei, R. S. Ashraf, M. Shahid, P. P. long, **R. Singh**, G. Pagona, V. G. Gregoriou, T. D. Anthopoulos, P. E. Keivanidis, M. Heeney, C. L. Chochos," Development of Conjugated Polymers with Optimized Optical and Electronic Properties for Single and Tandem Organic Photovoltaic Configurations" MRS, Boston, 2014.
8. **R. Singh**, E. A.-Sarduy, Z. Kan, T. Ye, P. E. Keivanidis," Efficient solution-processed organic solar cells based on a low-cost monomeric perylene-dimide acceptor." ICOE, Modena, Italy, June 11-13, 2014.
9. T. Ye, **R. Singh**, Ajay R. S. Kandada, H.-J. Butt, G. Floudas, P. E. Keivanidis," Establishing Structure-Property Correlations for Optimizing the Performance of Solution-Processed Perylene Diimide Solar Cells" MRS Spring, San Francisco, California, April 21-25, 2014.
10. **R. Singh**, T. Ye, E. Giussani, F. Di Fonzo, D. Fazzi, M. M. Mróz, J. C.-Gonzalez, A. G. Kontos, V. Licodimos, P. Falaras, J. Jacob, K. Müllen, H.-J. Butt, G. Floudas, P. E. Keivanidis," Structure-property correlations in blend films of perylene diimide:polymer composites for photovoltaic applications" HOPV13, Seville, Spain, May 5-8, 2013.
11. **R. Singh**, E. Giussani, F. D. Fonzo, D. Fazzi, M.M. Mróz, J. C.-Gonzalez, P. Ceroni, K.Mullen, J. Jacob, A. G. Kontos, V. Licodimos, P. Falaras, P. E. Keivanidis, ," The positive impact of aggregate formation in the photocurrent generation efficiency of solution processed perylene diimide solar cells" Next Generation Organics. Photovoltaics, Groningen, Netherlands June 2-5, 2013.
12. T. Ye, **R. Singh**, A. R. S. Kandada, H.-J. Butt, G. Floudas, G. Lanzani, P. E. Keivanidis, "Structure-property correlations in blend films of perylene-diimide excimeric solar cells." Optical Probes 2013, Durham, UK, July 14-19, 2013.
13. G. Saikia, **R. Singh**, M. Katiyar, P. K. Iyer," Synthesis, characterization and OLED fabrication studies with polyfluorene copolymers for pure blue emission" January 19-20, ICAMR 2013.
14. **R. Singh**, M. M. Mróz, F. D. Fonzo, J. C.-Gonzalez, K. Müllen, J. Jacob, P. E. Keivanidis," Improving the layer morphology of solution-processed perylene diimide organic solar cells with the use of a polymeric interlayer." MRS. Boston, USA, November 25-30, 2012.
15. **R. Singh**, R. K. Sharma, Deepak, M. Katiyar, A. Sharma," Improvement in micro-lens array and its fabrication for light out-coupling from OLED displays and lighting sources" E-MRS, Strasbourg, France, May 14-18, 2012.
16. **R. Singh**, V. Shukla, K. N. Unni, Display and Lighting,"Design and optimization of silver based microcavity for organic light emitting diodes" IWPSD, 2011.
17. A. Solanki, A. Awasthi, **R. Singh**, K. N. N. Unni and Deepak," New Processing Technique of Photolithography to make Defect Free Organic Light Emitting Diode Display" Display and Lighting, IWPSD, 2011.
18. W. Akther, **R. Singh**, A. Sharma, M. Katiyar, S. Seki," Photoluminescence quantum efficiency of ultraviolet emitting polymeric semiconductors" Proc. of ASID'06, 242, 8, New Delhi, India, 2006.
19. B.V. Mahesh, **R. Singh**, A. Sharma, W. Akther, M. Katiyar, "Flexible Organic Light Emitting Diodes" Proc. of ASID'06, 8, 395, New Delhi, India, 2006.
20. A. Raj, A. Bindal, **R. Singh**, A. Sharma, W. Akhtar, and M. Katiyar, "Device Degradation Studies of MEHPPV based polymer light emitting Diodes" Proc. of ASID'06, 8, 223, New Delhi, India, 2006.

Book Chapters:

1. **Book Chapter:** Origin of Hysteresis in Perovskite Solar Cells, in Soft-Matter Thin Film Solar Cells: Physical Processes and Device Simulation, R. **Singh**, M. J. Parashar, AIP Publishing, 2021.

- 2. Book Chapter: The Physics of Semiconductor Devices, R. Singh, S. R. Suranagi, M. Kumar, V. K. Shukla, Mixed solvent engineering to optimize morphology and optical properties of perovskite thin films for an efficient solar cell, Springer Nature Switzerland AG, 309-313, 2019 (DOI: 10.1007/978-3-319-97604-4_47).**

Patents:

- 1. A Novel Bifacial Perovskite Photovoltaic Architecture for Harvesting Energy from Artificial Indoor LED Light Sources (App. N. - 202211063783), 2022. 2. Perovskite Ink for Optoelectronic Application (*Under Preparation*)**