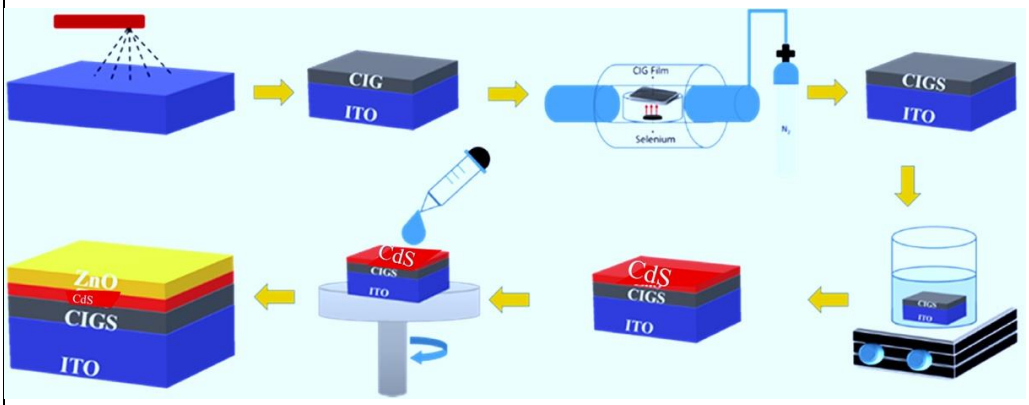
Website Information
Department of Physics
Dayananda Sagar University

Faculty details:

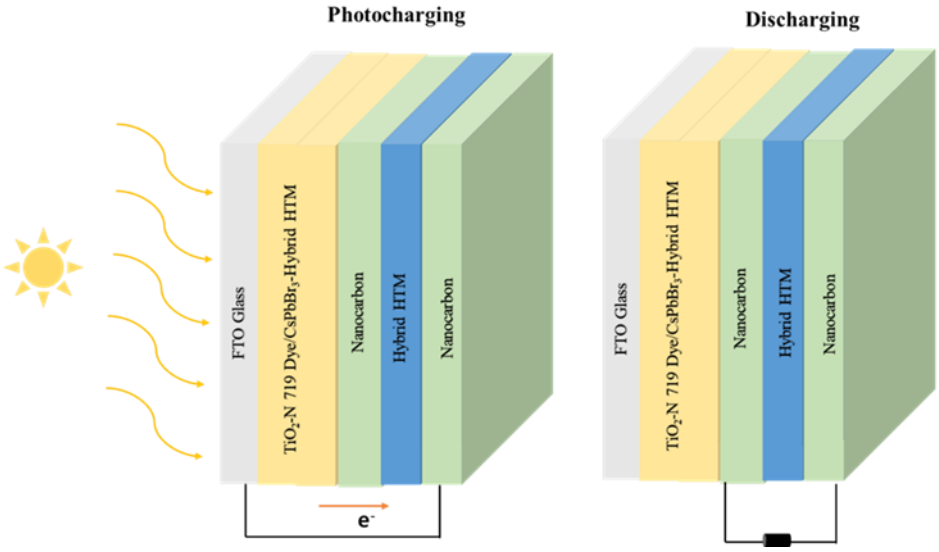
Item	Details
Faculty Name:	Dr. Rajesh Cheruku
Room No:	A-213
Designation:	Associate Professor
E-Mail	rajesh-phy@dsu.edu.in chraj.25@gmail.com
Research Area:	Lithium Ion Batteries Solar Cells Gas Sensors Materials Electromagnetic Shielding Materials
Publications (Past 5 years)	1. **Rajesh Cheruku,** Jae Hong Kim, V. B Murali Krishna, P. Periyat, SSSR Sarathbabu Duvvuri, Photo-Electrodes Decorated with Carbon Quantum Dots: Efficient Dye-Sensitized Solar Cells, Results in Engineering, Results in Engineering 20 (2023) 101611 (Corresponding author) **ISSN: 2590-1230** 2. U. Chalapathi, Alla Subba Reddy, P. Reddy Prasad, G. Manjula, Sambasivam Sangaraju, **Rajesh Cheruku,** Bandar Ali Al-Asbahi, Salh Alhammadi, C. Parthasaradhi Reddy, Krithikaa Mohanarangam, B. Purusottam Reddy, Si-Hyun Park, Two-stage-processed $AgSbS_2$ films for thin-film solar cells, Materials Science in Semiconductor Processing 168 (2023) 107821 (one of the author) **ISSN: 1369-8001** 3. U. Chalapathi, P. UdayBhaskar, **Rajesh Cheruku**, S. Sambasivam, Si-Hyun Park, Evolution of large-grained CuSbS thin films by rapid sulfurization of evaporated Cu–Sb precursor stacks for photovoltaics application, Ceramic International 49 (2023) 4758–4763 **ISSN: 0272-8842** 4. B. Poornaprakasha, S.V. Prabhakar Vattikuti, K. Subramanyam, **Rajesh Cheruku**, Kamakshaiah Charyulu, Devarayapalli, Y.L. Kim, Vasudeva Reddy Minnam Reddy, Herie Park, M. Siva, Pratap Reddy, Photoluminescence and hydrogen evolution properties of ZnS:Eu quantum dots, Ceramic International 47 (2021) 28976-28984 (one of the author) **ISSN: 0272-8842**

	5. B. Poornaprakash, K. Subramanyam, **Rajesh Cheruku**, Y.L. Kim, M. Siva Pratap Reddy, Vasudeva Reddy Minnam Reddy, Mn and Al co-doped CdS:Cr nanoparticles for spintronic applications, Materials Science in Semiconductor Processing 134 (2021) 106055 (one of the author) **ISSN: 1369-8001** 6. Yu Jeong Jang, Chau Thi Thanh Thuy, Suresh Thogiti, **Rajesh Cheruku,** Kwang-Soon Ahn, Jae Hong Kim, Electrochemically Deposited Polypyrrole for Counter Electrode of Quasi-Solid-State Dye-Sensitized Solar Cell, Journal of Nanoscience and Nanotechnology, 20 (2020) 546-551 (one of the author) **ISSN: 1533-4880** 7. Ji Hyun Lee, Yu Jeong Jang, Dong Woo Kim, **Rajesh Cheruku**, Suresh Thogiti, Kwang-Soon Ahn, Jae Hong Kim, Application of Polypyrrole/ Sodium Dodecyl Sulfate/Carbon Nanotube Counter Electrode for Solid-State Dye-Sensitized Solar Cells and Dye-Sensitized Solar Cells, Chemical Papers 73 (2019) 2749-2755 (Corresponding author) **ISSN: 0366-6352** 8. Dong Woo Kim, **Rajesh Cheruku**, Suresh Thogiti, Bong-Ki Min, Jae Hong Kim, Nanocrystalline MoO_3/Polymerized Dibromo-EDOT as Hybrid Nanocomposite: Efficient Hole Transport Material for Solid-State Dye-Sensitized Solar Cells, CHEMNANOMAT, 5 (2019) 738-747 (Corresponding author) **ISSN: 2199-692X** 9. Phuong Ho, Toi Nguyen Van, Ji Hyun Lee, Yu Jeong Jang, **Rajesh Cheruku**, Chinho Park, Kwang-Soon Ahn, Jae Hong Kim, Shape Control Iron Pyrite Synthesized by Hot Injection Method: Counter Electrode for Efficient Dye-Sensitized Solar Cells, Electronic Materials Letters, 15 (2019) 350-356 (corresponding author) **ISSN: 1738-8090** 10. **Rajesh Cheruku**, D. Surya Bhaskaram, G. Govindaraj, Lakshmi Vijayan, Nanocrystalline Li_2MoO_4: Synthesis and Electrical Studies, Journal of Alloys and Compounds, 788 (2019) 779-786 (Main author) **ISSN: 0925-8388** 11. Hyeonjun Jeong, Ramesh Kumar Chitumalla, Dong Woo Kim, S.V. Prabhakar Vattikuti, Suresh Thogiti, **Rajesh Cheruku**, Jae Hong Kim, Joonkyung Jang, Ganesh Koyyada, Jae Hak Jung, The comparative study of new carboxylated 1, 3-indanedione sensitizers with standard cyanoacetic acid dyes using co-adsorbents in dye-sensitized solar cells, Chemical Physics Letters 715 (2019) 84–90 (one of the author) **ISSN:0009-2614** 12. Chang Hee Son, Suresh Thogiti, Ramesh Kumar Chitumalla, Ganesh Koyyada, **Rajesh Cheruku**, Joonkyung Jang, Jae Hak Jung, Jae Hong Kim, Synthesis and investigation of anchoring unit effect in blue-colored isoindigo-based D–A–π–A organic dyes for dye-sensitized solar cells,

	Japanese Journal of Applied Physics 57 (2018) 122302 (one of the author) **ISSN:1347-4065** 13. Dong Woo Kim, **Rajesh Cheruku,** Suresh Thogiti, Ganesh Koyyada, Phuong Ho, Jae Hong Kim, The Effect of Difference Molar Ratios of Dibromo-EDOT as Hole Transporting Material for Solid State Dye-Sensitized Solar Cells, Journal of Inorganic and Organometallic Polymers and Materials 6 (2018) 2871-2874 (corresponding author) **ISSN: 1574-1443** 14. **Rajesh Cheruku,** D. Surya Bhaskaram, G. Govindaraj, Variable range hopping and relaxation mechanism in graphene oxide sheets containing sp^3 hybridization induced localization, Journal of Materials Science: Materials in Electronics 29 (2018) 9663-9672 (Main author) **ISSN**: **0957-4522** 15. Phuong Ho, Suresh Thogiti, Le Quoc Bao, **Rajesh Cheruku**, Kwang-Soon Ahn, Jae Hong Kim, Enhanced efficiency via blocking layers at photocathode interfaces in cobaltmediated tandem dye-sensitized solar cells, Solar Energy 161 (2018) 9–16 (one of the author) **ISSN**: **0038-092X**
Sponsored Projects (Past and Ongoing)	Telltale of Galactic Black Hole X-ray binaries from AstroSat archival observation **ISRO - Space Science Program office** **24 Lakhs, 4 years**
Profile Links: Scopus and Orcid	Scopus Author ID: 36909817200 https://orcid.org/0000-0003-4999-5574 Google Scholars: https://scholar.google.com/citations?user=XKebVggAAAAJ&hl=en

Research Activities (Write about your best research results max of 2-3 pages including diagrams)	**1. Design and Development of Printable non-toxic ink for Flexible Solar Cells** Among all resent solar cells, one of the most promising materials is doubtless the **Copper Indium Gallium Selenide (CIGS)** that performs very well in terms of lifetime and processability, ensuring, at the same time, high conversion efficiency. On the other hand, solar paints are more appealing because these are light weight, few nanometers in size and flexible as compared to single crystal silicon wafer solar cells which are relatively big in size, bulky and breakable. Due to the existence of these paints in solution form, it also removes the barrier of installing limited number of solar cells in a confined area for the generation of electricity.  **2.Design and Fabrication of a Novel Solid-State Photo-Supercapacitor Based on the Hybrid Hole Transport Materials**

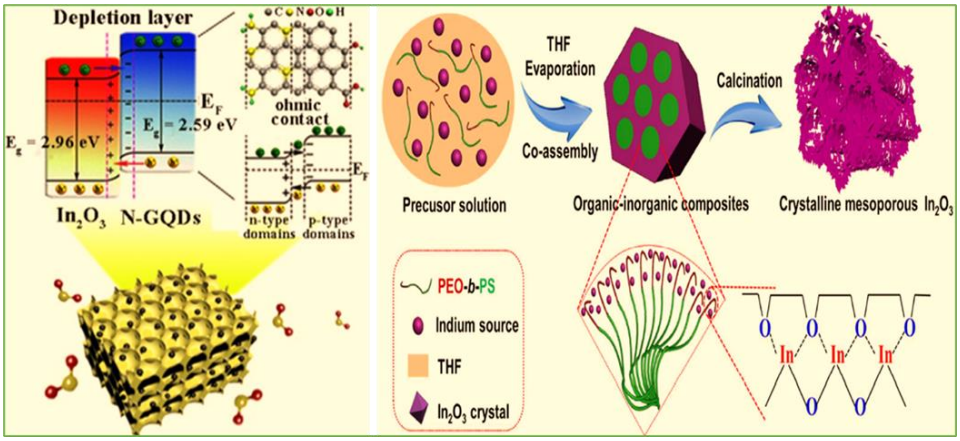
The solar energy harvesting is based on (Dye-sensitized solar cells) DSSC or (Perovskite solar cells) PeSCs is a promising photovoltaic device to get an excellent conversion efficiency. Because of their excellent lowlight performance which allows their use in enclosed applications, tunable device color, and transparent cell, which is allowing for the modifying of the integrated device. In parallel, nanocarbon-based supercapacitor delivers promising performance. So, to obtain a desirable integrated device (photo-supercapacitor) that can harvest and storge the solar



energy in a single cell. It can fill the gap in the area of the single solar cell harvesting and storage.

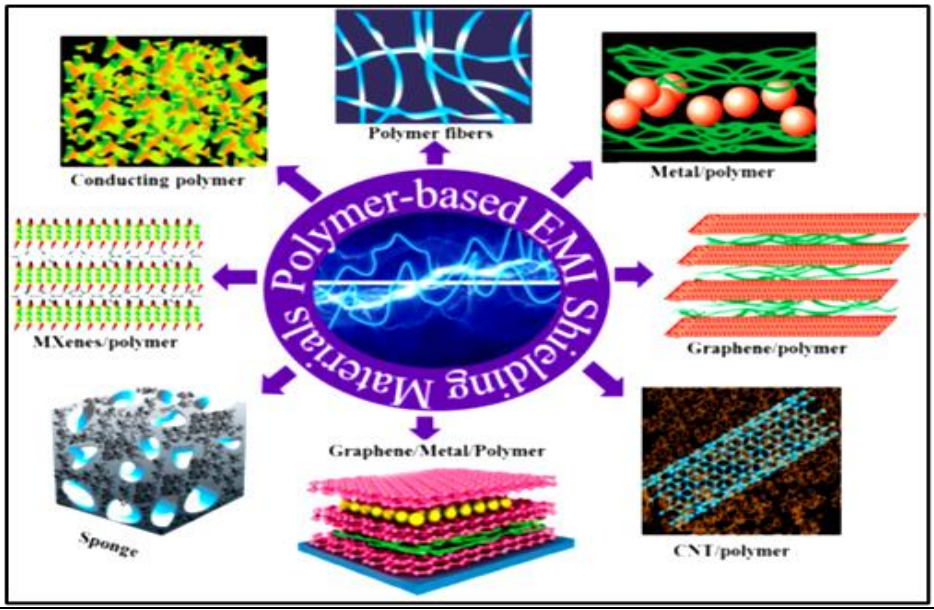
3. High-performance NO_2 gas sensing at room temperature

A numerous tactics have been taken into consideration when developing NO_2 gas sensors. One of the promising strategies is the use of SMOs. The advantages of SMOs based sensors include their simplicity, low cost, capacity to detect a variety of toxins, and greater gas responsiveness. The commercial viability of SMO-based gas sensors is hindered by their lengthy response and recovery times, high operating temperatures, lack of non-repeatability, stability, and particular selectivity. In this case, considerable attention is required, from the choice of a particular SMO through the synthesis process and into its function as a sensing element. Since the gas sensing method of chemiresitive type sensors mostly depends on the adsorption-desorption of gases, the interesting morphologies of SMOs play a crucial role in gas sensing. The unusual morphologies of SMOs can provide effective adsorption sites for the interaction of gas molecules. It is difficult to create morphologies that are appropriate for more advanced gas sensing behavior. Another significant problem is the high operating temperature. But in our proposal, we'll create a composite material made of carbon dots and In_2O_3 nanoparticles decorated to WO_3 nanorods that will function as a NO_2 gas sensor at ambient temperature.



4. Design and Development of Polymer Matrix-Based Nanocomposites with MWCNT for EMI-Shielding Applications

The polymer composites have become versatile materials with tunable mechanical, dynamic, optic and electromagnetic properties, which helps to expand their application field. The polymers and polymer composites demonstrate great promise as light weight, thermally stable, mechanically strong, ultraefficient EMI shielding materials in advanced application fields, such as in electronics, radars, flexible portable and wearable electronic devices, aircraft, defense, aerospace applications, military applications or stealth technology.



Collaborations	Yenungnam University South Korea, IIT Bombay, Central University of Pondicherry.
Open Positions	One Ph.D. position is open