International Journal of Photoenergy

Special Issue on
Perovskite Solar Cells

CALL FOR PAPERS

Photovoltaic (PV) research focuses on increasing solar cell conversion efficiencies, lowering a cost of solar cells, modules, and systems, and improving the reliability of all PV components. Photovoltaic cells can utilize about a third of the incident solar energy, with another third lost to heat and the last third lost to other processes instead of being converted into electricity. Recently reported organic-inorganic halide perovskite solar cell material shows a great potential for photovoltaic applications due to a combination of desirable properties such as a high absorption coefficient, a long charge diffusion length, an appropriate bandgap, and solution processability.

The impressive properties of perovskite could ultimately allow efficiencies as high as 25% in individual devices, as high as that of today's commercial PV champions made of single-crystal silicon. Because of its high conductivity the perovskite requires a thick layer of a hole transport material to avoid pinholes. Therefore, it is of importance to investigate perovskite solar cells using different hole transport materials to develop better understanding of both the charge transfer and effects of a hole transport material on the solar cell performance. Another important consideration for the perovskite/hole transport material solar cell performance is a balance between series and shunt resistances. In addition, a clear understanding of perovskite solar cell fundamental science (e.g., interfacial charge dynamics) and the device physics (e.g., origins of the I–V hysteresis) is still lacking.

These problems are nontrivial and require an interdisciplinary group of researchers with diverse backgrounds to solve them. The PV R&D community is now working on developing perovskite cell materials, device architectures, and processing tools, and there has been a rapid growth in commercial equipment for improved manufacturing and a higher throughput. One of the major areas expected to receive much attention is characterization and measurements.

This special issue will compile papers on different research aspects of measurements and characterization of perovskite solar cells. We invite researchers, academicians, and industry technologists to contribute original research articles as well as reviews related to perovskite solar cell.

Potential topics include, but are not limited to:

- Density functional theory and band structure calculations of perovskite materials
- Preparation and characterization of perovskite materials based solar cells
- Physics of perovskite solar cells
- Design and architecture of perovskite solar cells
- Processability of perovskite solar cells
- Energetics at perovskite interfaces
- Photophysics of perovskite materials

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