

Realization of a low carbon society through game changing technologies

Pb-free Perovskite Solar Cells Consisting of Sn

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Summary :

We will develop high performance of Sn-based perovskite solar cells using environmentally friendly, Pb-free materials, which could be commercialized at large scale.

It has become clear that the efficiency of Sn-based perovskite solar cells is held back by the large density of trap sites present in the perovskite absorbers. The origin of these trap sites, which act as recombination centers for the generated charge, are impurities and lattice defects arising from the facile oxidation of Sn(II)-containing materials.

In our exploratory research on this topic, we have improved the performance of Sn-based perovskite solar cells by focusing on the fabrication of high-quality perovskite semiconductor thin films. This included developing the necessary high-quality proprietary starting materials. These efforts have led to world-leading results.

In the proposed research, based on the results and knowledge gained to date, we will pursue the development of original materials focusing on elemental hybridization (alloying) to further optimize high-quality perovskite semiconductor thin films and devices. Through these efforts, we aim to achieve Sn-based perovskite solar cells with ultra-high performance (single-layer devices with >20% efficiency, tandem devices with >30% efficiency) and high durability (>20 years).

Portable Power Stations as Future Energy Systems

