Solar Cell Progress Research Report

All-perovskite tandem solar cells (TSCs) consist of a wide-bandgap (WBG, 1.75-1.8 eV) top subcell and a low-bandgap (LBG, 1.2-1.3 eV) bottom subcell, exhibit superior power conversion efficiencies (PCEs) compared to single-junction perovskite solar cells (PSCs).

Perovskite solar cells (PSCs) have emerged as a subject of strong scientific interest despite their remarkable photoelectric characteristics and economically viable manufacturing processes. After more than ten years of delicate research, PSCs" power conversion efficiency (PCE) has accomplished an astonishing peak value of 25.7 %.

We report a highly efficient solar cells based on a submicrometer (~0.6 µm) rutile TiO2 nanorod sensitized with CH3NH3PbI3 perovskite nanodots. Rutile nanorods were grown hydrothermally and their ...

This paper summarizes the internal structure, physical parameters and research progress of solar cells. First, the internal structure of solar cells, such as carrier transport and P-N junction, are introduced. Secondly, according to the structure of solar cells, some important physical parameters like IV curve, short circuit current, open ...

This Collection presents recent research efforts in stabilizing perovskite solar cells with three interconnected themes: characterizing instability, synthesizing stable ...

With the rapid increase of efficiency up to 22.1% during the past few years, hybrid organic-inorganic metal halide perovskite solar cells (PSCs) have become a research "hot spot" for many solar cell researchers. The perovskite materials show various ...

It is encouraging that research activities are now being directed and devoted towards the development of new perovskite-based solar cells, which are showing promising results as an alternative photovoltaic device to traditional Si-based p-n junction solar cells. Here, it is important to mention that the discovery of PSCs was inspired by the operating principle of ...

Here, the authors reconstruct the surface through nano-polishing followed by passivation, achieving certified efficiency of 33.1% for perovskite/silicon tandem solar cells. ...

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This Collection presents recent research efforts in stabilizing perovskite solar cells with three interconnected themes: characterizing instability, synthesizing stable perovskites and curing...

Metal halide perovskite solar cells (PSCs) show great promise in the photovoltaic field due to their tunable bandgap, high extinction coefficient, small exciton binding energy, long carrier diffusion length, and high carrier mobility. 1, 2 Nowadays, the reported PSCs with high efficiency are mainly realized with the organic-inorganic hybrid perovskites and the ...

At present, the global photovoltaic (PV) market is dominated by crystalline silicon (c-Si) solar cell technology, and silicon heterojunction solar (SHJ) cells have been developed rapidly after the concept was proposed, which is one of the most promising technologies for the next generation of passivating contact solar cells, using a c-Si substrate ...

This paper reviews the recent development of cost-effective and high-efficient solar cell technologies. This report paper covers low-cost and high-efficiency perovskite solar cells. The development and the state-of-the-art ...

Nearly all types of solar photovoltaic cells and technologies have developed dramatically, especially in the past 5 years. Here, we critically compare the different types of photovoltaic ...

Perovskite solar cells have the potential to achieve the standards required for commercialization. Here, Bilal et al. review the scalable fabrication routes for various structures and the compositions of perovskite solar cells and modules. Scalable fabrication and operational stability are necessary features before this technology can be used in industrial applications including agrivoltaics ...

This paper summarizes the internal structure, physical parameters and research progress of solar cells. First, the internal structure of solar cells, such as carrier transport and ...

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