Organic inorganic halide perovskite photovoltaics

This book covers fundamentals of organometal perovskite materials and their photovoltaics, including materials preparation and device fabrications. Special emphasis is given to halide perovskites. The opto-electronic properties of perovskite materials and recent progress in perovskite solar cells are described.

Organic-inorganic halide perovskites have launched a new era of low-cost, high-efficiency solar cells, due to their easy solution processability and superior optical and electrical properties for the photovoltaic effect.

Recently, organic-inorganic halide perovskites have sparked tremendous research interest because of their ground-breaking photovoltaic performance. The crystallization process and crystal shape of perovskites have striking impacts on their optoelectronic

The photovoltaics of organic-inorganic lead halide perovskite materials have shown rapid improvements in solar cell performance, surpassing the top efficiency of semiconductor compounds such as CdTe and CIGS (copper ...

The recorded efficiency of Pb-based halide perovskite solar cells (PSCs) has gone beyond 24%, thus fulfilling their potential for industrialization. The photovoltaic performance of PSCs is predominantly determined by the quality of the perovskite film, which in turn, is controlled by the fabrication process.

An emerging family of semiconductor materials -- organic-inorganic halide perovskites (OIHPs) -- are the focus of the photovoltaic research community owing to their use of low cost,...

In this article, we systematically summarize the development of WBG organic lead halide perovskites by focusing on the material composition, optimization strategy, and device performance, as well as the issues of phase segregation and voltage loss.

Taking advantage of tunable bandgap of the perovskite materials, the WBG perovskites can be easily obtained by substituting halide iodine with bromine, and substituting organic ions FA and MA with Cs. To date, the most concerned issues for the WBG perovskite solar cells (PSCs) are huge VOC deficit and severe photo-induced phase separation.

This review will explore beyond the current focus on three-dimensional (3-D) lead(II) halide perovskites, to highlight the great chemical flexibility and outstanding potential of the broader class of 3-D and lower dimensional organic-based perovskite family for

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