Photovoltaically top-performing perovskite crystal facets

Postfabrication surface treatment strategies have been instrumental to the stability and performance improvements of halide perovskite photovoltaics in recent years. However, a consensus understanding of the complex reconstruction processes occurring at the surface is still lacking. Here, we combined complementary surface-sensitive and depth-resolved techniques ...

Photovoltaically top-performing perovskite crystal facets ... Crystal facet evolution of perovskite film by PPD (A and B) (A) SEM images and (B) XRD patterns of the annealed perovskite films formed from different precursor solutions without and with the additive of DABCO and PPD. ... (100), (111), and (110) facets and (B, D, and F) the ...

This web page provides additional data and analysis for the research paper on photovoltaically top-performing perovskite crystal facets published in Joule journal. It includes figures, tables, ...

Such facet effects have been observed also in halide perovskites [6][7][8][9], an emerging class of solution-processed semiconductor materials with exceptional optoelectronic properties [10][11][12].

Discovering the top-performing facets of perovskite crystals holds the secret to highly efficient perovskite solar cells (PSCs). However, the dominated facet properties of perovskite (i.e., (100 ...

Perovskite solar cells (PSCs) stand at the forefront of photovoltaic research, with current efficiencies surpassing 26.1%. This review critically examines the role of electron transport materials...

This article reports the discovery of the top-performing facets of perovskite crystals for photovoltaic applications. It also discusses the effects of surface chemistry and symmetry on ...

Facet engineering has attracted increasing attention only recently in the perovskite solar cell community, and related deep investigation is rather rare. To date, it is still difficult to precisely regulate and directly observe perovskite films with specific crystal facets due to the limitations of solution methods and characterization technology.

Photovoltaically top-performing perovskite crystal facets Single-crystal-assembled perovskite thin film is achieved in this work. Photovoltaically top-performing (100) and (111) facets are directly proved based on the well-defined facets, leading to a stable perovskite solar cell with a PCE of 24.64%. Chunqing Ma, Min-Chul Kang,

<p>Metal halide perovskite solar cells (PSCs) are one of the most promising photovoltaic devices. Over

time, many strategies have been adopted to improve PSC efficiency, and the certified efficiency has reached 26.1%. However, only a few research groups have fabricated PSCs with an efficiency of & gt;25%, indicating that achieving this efficiency remains uncommon. To develop ...

Facet engineering is an important strategy for tuning the physical, chemical, and electronic properties of a crystal surface, and it also provides an effective route to improve the device performance in many fields. Complex crystal structures with rough morphologies have been observed for most of the hybrid perovskite thin films. Thus, it is speculated whether high ...

In particular, single-crystal organometallic perovskite optical fibers have many advantages in high-speed all-fiber optoelectronics. Organometallic perovskites have direct bandgap and low defect densities, which are efficient at emitting light (33, 34).Direct bandgap low-loss single-crystal organometallic perovskite optical fibers can be a suitable candidate for the ...

Photovoltaically top-performing perovskite crystal facets ... Discovering the top-performing facets of perovskite crystals holds the secret to highly efficient perovskite solar cells (PSCs). However, the dominated facet properties of perovskite (i.e., (100), (110), (111) facets) remain elusive. ... crystal facet are almost comparable with those ...

Semantic Scholar extracted view of "Modulated crystallization and enhanced stable of high efficient perovskite solar cells with Pb(Ac)2" by L. Chen et al. ... Photovoltaically top-performing perovskite crystal facets. Chunqing Ma Min-chul Kang ... The performance of FAPbI3-based perovskite solar cells (PSCs) has been drastically improved with a ...

Single-crystal-assembled perovskite thin film is achieved in this work. Photovoltaically top-performing (100) and (111) facets are directly proved based on the well-defined facets, leading to a stable perovskite solar cell with a PCE of 24.64%.

skite crystal is enclosed by (100) facets, with (111) facets at the trunc ated corners. A sche-maticmodelofthe(100)and(111)facetsona perovskite cubic crystal and atomic arrange-ments are shown in Fig. 1B. The metal cations (Pb)or organic cations(FA)are connectedto I anions on the (100) facet with Pb-I or FA-I layer terminations. The (111) facet ...

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The well-defined facets on the thin film also provide a platform for the study of facet heterogeneity, which directly proves the photovoltaically top-performing (100) and (111) facets. Discovering the top-performing facets of perovskite crystals holds the secret to highly efficient perovskite solar cells (PSCs). Yet, the

dominant facet ...

Fig. 1 (d) presents X-ray diffraction (XRD) patterns of pristine, SSG@40 °C, and SSG@60 °C CH 3 NH 3 PbI 3 films. The entire XRD peaks except the ones from substrates can be indexed to perovskite CH 3 NH 3 PbI 3 with tetragonal phase [5, 6, 26] ch results suggest that SSG process does not alter the crystal phase and component of original CH 3 NH 3 PbI 3 ...

Photovoltaically top-performing perovskite crystal facets. C Ma, MC Kang, SH Lee, SJ Kwon, HW Cha, CW Yang, NG Park ... A layered (n-C 4 H 9 NH 3) 2 CsAgBiBr 7 perovskite for bipolar resistive switching memory with a high ON/OFF ratio. SY Kim, JM Yang, SH Lee, NG Park ... Effect of fluorine substitution in a hole dopant on the photovoltaic ...

In this work, FAPbI3 (FA, formamidinium)-based perovskite film assembled by single crystals with well-defined facets (i.e., (100) and (111) facets) is achieved with piperi-dine (PPD) as an additive.