Ferroelectric properties and solar container efficiency

Can ferroelectric materials improve photovoltaic conversion efficiency?
Ferroelectric materials can also exhibit the bulk photovoltaic effect (BPVE) in an additional process than conventional semiconductors. In recent decades,interest in these phenomena has increased and there is the prospect of improving photovoltaic conversion efficiencyto exceed that of commercial solar cells based on Si p-n junctions.

Can ferroelectric materials be integrated with photovoltaic devices?
The integration of ferroelectric materials with photovoltaic devices,where the ferroelectric materials are used as a component in the active layer or as an interfacial layer in conjunction with the perovskite layer,has also been exploredto generate a stable and controllable polarized electric field for charge separation and charge collection.

What are the advantages of 2D ferroelectric perovskite?
PSCs fabricated with the 2D ferroelectric perovskite show enhanced performance with power conversion efficiency of 25.31 %. The devices also exhibit improved stability, maintaining over 80 % of their initial efficiency for 1000 h under maximum power point tracking.

Do single layer ferroelectric photovoltaics have a maximum power conversion efficiency?
Single layer ferroelectric photovoltaics (FePvs) were originally predicted to have a maximum power conversion efficiency (PCE) less than 0.01%based on calculations of the theoretical lifetimes of thermalized and nonthermalized electrons.

Can ferroelectric energy conversion improve the performance of perovskite solar cells?
As a result,the integration of the ferroelectric process with the photon-to-electron energy conversion process becomes feasibleto generate interesting photo-physical properties and further boost the device performance of perovskite solar cells (PSCs),which have started to attract more and more attention in recent years.

Why is thickness reduction of ferroelectric layers important for bulk PV effect-based devices?
Because the thickness reduction of ferroelectric layers leads to lower absorption efficiency of incident light,the optimal design of device structures to maximize the total conversion efficiency will be crucial for practical applications of bulk PV effect-based devices.

It is demonstrated that the photovoltaic properties of Na0.5 Bi 0.5 FeO 3 solar cell are affected by both charge transport dynamic and interfacial charge recombination tuned by ferroelectric ...

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Semantic Scholar extracted view of "The electrochemical, dielectric, and ferroelectric properties of Gd and Fe doped LaNiO3 with an efficient solar-light driven catalytic activity to oxidize ...

With the capability to manipulate the built-in field in solar cells, ferroelectricity is found to be a promising attribute for harvesting solar energy in solar cell devices by influencing associated device parameters. ...

Considering the unique properties of the two materials, it could possibly combine BVO and ferroelectric BFO by the surface passivation approach to build a composite material-based ...

The main theoretical models of the bulk photovoltaic effect (BPVE) in photo-ferroelectric materials have been presented and the impact of key parameters on the overall power ...

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Enhanced electron transport induced by a ferroelectric field in efficient halide perovskite solar cells Hamaneh Zarenezhad a b, Masoud Askari c, Mohammad Halali c, Navid Solati a d, ...

In addition to discussing the implications of a ferroelectric absorber layer, and the solid state theory of polarisation (Berry phase analysis), design principles and opportunities for high ...

Halide perovskite solar cells (PSCs) have shown outstanding performance, which can be further improved through enhancing the built-in electric field (Vbi) and reducing non-radiative ...

The search for materials with appropriate ferroelectric and photovoltaic properties is an intense field of research. The main objective of these studies is to obtain efficient materials for solar ...

Devices based on ferroelectric photovoltaic materials yield an open-circuit voltage that is much higher than the band gap of the corresponding active material owing to a strong internal electric field. Their ...

A built-in electric field established in these materials due to the ferroelectric property is more helpful for the separation of e-h pairs and enhancing the power conversion efficiency during ...

Coupling the ferroelectric polarization and internal electric field to realize effective separation and migration of photogenerated charges is highly attractive for accomplishing efficient ...

The ferroelectric properties were therefore investigated. With a switching energy barrier of 19.83 meV per atom, CsGeI 3 has a higher theoretical ferroelectric polarization strength of 15.82 ...

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Photocatalytic water splitting represents a promising approach for sustainable energy production, yet its practical implementation remains hindered by insufficient light absorption, rapid ...

1. Introduction ferroic properties of single crystal samples,[5,6] pressed powder pellets,[7] and polycrystalline thin-films[8] of OMH perovskites. Efficient charge carrier separation and transport in ...

The electrochemical, dielectric, and ferroelectric properties of Gd and Fe doped LaNiO3 with an efficient solar-light driven catalytic activity to oxidize malachite green dye Journal of Colloid and Interface ...

Ferroelectric properties can be utilized for efficient charge carrier separation through spontaneous electric polarization. Here, we reveal the potential of ferroelectric-assisted charge ...

The electrochemical, dielectric, and ferroelectric properties of Gd and Fe doped LaNiO 3 with an efficient solar-light driven catalytic activity to oxidize malachite green dye

While the ferroelectric property of the 0-3 type BT-Au ceramic remains robust. As a result, the composite ceramics show excellent ferroelectric photovoltaic effect with a photocurrent ...

Ferroelectric materials can also exhibit the bulk photovoltaic effect (BPVE) in an additional process than conventional semiconductors. In recent decades, interest in these ...

Exploitation of suitable ferroelectric materials having narrow-band gap useful for visible region are promising for their potential application in both novel optoelectronic and the solar energy ...