Ferroelectric solar container materials

Can ferroelectric materials be used in solar cells?
The application of ferroelectric materials (i.e. solids that exhibit spontaneous electric polarisation) in solar cells has a long and controversial history. This includes the first observations of the anomalous photovoltaic effect (APE) and the bulk photovoltaic effect (BPE).

Are ferroelectrics a photovoltaic material?
Ferroelectrics,especially oxide-based ferroelectrics,are exciting class of materials with novel photovoltaic properties.

What is a ferroelectric solar cell?
Unlike conventional silicon solar cell technology, the fundamental mechanism of ferroelectric photovoltaics allows large open circuit voltage through bulk photovoltaic effect. We discuss the fundamental physics behind the solar energy conversion first, in traditional p-n junction solar cell, and then extend that to prototype ferroelectrics.

Can ferroelectric materials be used to harvest solar energy?
Ferroelectric materials with diverse functionalities could be utilized to harvest solar energythrough various mechanisms. The present chapter discusses solar energy harvesting strategies using ferroelectric materials through solar photovoltaics and photochemical energy conversion.

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.

What makes ferroelectric photovoltaics different from p-n based solar cells?
Another unique feature of ferroelectric photovoltaics is that,unlike p-n based solar cells,the photovoltage of FePvs is not limited by the material's bandgap(E g); open circuit voltages (VOC) as large as 1600 V have been measured in LiNbO 3.

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The field of ferroelectric materials is continuously expanding towards new realms of extraordinary properties and applications. New materials have been synthesized, and more advanced ...

This work establishes a promising approach to utilizing 2D ferroelectric perovskite for regulating the

crystallization of perovskite and combining molecular ferroelectrics with PSCs.

Ferroelectric materials offer a wide range of useful properties. These include ferroelectric hysteresis (used in nonvolatile memories), high permittivities (used in capacitors), high piezoelectric ...

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 ...

Thirdly, compared with the traditional pyroelectric materials, the unique polarization switching makes ferroelectrics have a universal mean to increase the intensity-external field. Fourthly, ...

As a result, the integration of the ferroelectric process with the photon-to-electron energy conversion process becomes feasible to generate interesting photo-physical properties and ...

High-performance ferroelectric materials are used in many applications, ranging from actuators to capacitors. Now, high entropy is emerging as an effective and flexible strategy for ...

Reexamining the Role of Solution-Cast Ferroelectric Polymer Interlayer toward Enhanced Efficiency and Stability in Conventional Organic Solar Cells

Ferroelectric materials have been a focus of much research over the last few decades for their unique piezoelectric and optoelectronic properties. ...

Spontaneous polarization is shown to enhance the lifetimes of photogenerated species in BaTiO3. This is attributed to polarization-induced surface band bending acting as a thermal barrier to electron/hole ...

Ferroelectric Materials for Solar Energy Scavenging and Photodetectors The photovoltaic devices based on ferroelectrics have drawn plenty of attention for providing a promising solar energy harvesting ...

The use of ultra-wide bandgap transparent conducting beta gallium oxide (?-Ga2O3) thin films as electrodes in ferroelectric solar cells is reported. In a new material structure for energy applications, ...

Ferroelectric materials can maintain the polarisation even once the electric field is removed. Ferroelectric materials have some similarities over ...

Strain is a conventional mechanical means for optimizing light absorption of photocatalysts. Herein, an additional degree of freedom-ferroelectricity is introduced into this process, enhancing not only solar ...

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

Ferroelectric materials have been a focus of much research over the last few decades for their unique piezoelectric and optoelectronic properties. Conventional solar cells have been ...

Developing ferroelectric materials with low bandgaps, engineering electrodes to optimize charge extraction, and advancing FePv device ...

In ferroelectric materials, such polarizations can be reversed with an external electric field. Today, ferroelectric materials are widely used in sensors, actuators and memories.

Autonomous high-power ferroelectric systems expand the applications of ferroelectric materials in mining engineering, remote power supplies, mineral, gas and oil explorations, geology ...

Ferroelectric materials offer a wide range of useful properties. These include ferroelectric hysteresis (used in nonvolatile memories), high permittivities (used in capacitors), high piezoelectric effects ...

Recently, some of ferroelectric materials are introduced in these solar cells due to their special properties. They can be used not only as light absorbing materials in ferroelectric solar cells, but also ...

This article reviews recent achievements in ferroelectric nanomaterials and their applications in energy harvesting and self-powered ...

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Ferroelectric photovoltaic materials and devices utilise the inherent spontaneous polarisation of ferroelectrics to enhance charge separation under illumination. This unique capability...

Ferroelectric materials, with their spontaneous polarization-induced built-in electric fields, hold promise for Li-metal batteries. The versatile ...

Ferroelectric materials with multiple effects have great potential for applications in the fields of photoelectric detection, photoelectric storage, etc. This manuscript summarizes briefly the ...

Abstract The photovoltaic devices based on ferroelectrics have drawn plenty of attention for providing a promising solar energy harvesting ...

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Abstract The photovoltaic devices based on ferroelectrics have drawn plenty of attention for providing a promising solar energy harvesting technology and efficient photodetectors. In ...

Ferroelectric solar container materials

Ferroelectrics are a class of polar and switchable functional materials with diverse applications, from microelectronics to energy conversion. Computational searches for new ...

Research contents Based on experimental research such as material synthesis, evaluation of physical properties, and structural analysis, we are working for ...

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