VDB Solar Solutions

Photovoltaic materials and devices 2017

Overview

Are photovoltaic materials efficient?

Recent developments in photovoltaic materials have led to continual improvements in their efficiency. We review the electrical characteristics of 16 widely studied geometries of photovoltaic materials with efficiencies of 10 to 29%.

What is a photovoltaic band-gap energy EPV G?

This leads us to the definition of a photovoltaic band-gap energy EPV g as a reference value for the analysis of the device performance. For a variety of solar-cell devices, we show that the combination of QPV e and electroluminescence measurements allows for a detailed loss analysis that is fully compatible with the principle of detailed balance.

Do switchable diodes have an anomalous photovoltaic effect?

Switchable diodes and an anomalous photovoltaic effect have been observed in ferroelectric materials 143; however, the anomalous photovoltaic effect in these hybrid perovskite devices was shown to be caused by the ion migration effect 71, 96, 141, 144.

Does a perovskite solar cell have an anomalous photovoltaic effect?

Recently, an anomalous photovoltaic effect in laterally structured perovskite solar cells was discovered, whereby the largest obtained VOC of 18 V in a device with an electrode spacing of 100 μm significantly exceeded the ratio of energy bandgaps (Eg) of the perovskite materials to electron charge 96 (that is, VOC > Eg / q, Fig. 7b).

Can thin-film solar cells be used in building-integrated PV?

Thin-film solar cells deposited on thin foils are also expected to find new applications in areas where low weight-specific power (in terms of watts per gram) is desired, and in novel forms of building-integrated PV where flexible

form factors or partial transparency for visible light are desired.

Is there a switchable photovoltaic effect in Organometal trihalide perovskite devices?

Matter20, 021001 (2008). Xiao, Z. et al. Giant switchable photovoltaic effect in organometal trihalide perovskite devices. Nat. Mater.14, 193–198 (2015). The first work that demonstrated the ion-migration effect and switchable photovoltaic effect in OIHPs.

Photovoltaic materials and devices 2017

Understanding the physical properties of hybrid perovskites for

New photovoltaic materials have been searched for in the past decades for clean and renewable solar energy OIHP photovoltaic devices are blessed with very small V OC loss of this type because

Ferroelectric Photovoltaic Materials and Devices

Ferroelectric materials have been used in a wide range of piezoelectric, storage, sensor, and optoelectronic because of their unique optical and electrical properties. However, the small photogenerated current of ferroelectric photovoltaic devices is one of the

Metal-halide perovskites for photovoltaic and light-emitting devices

Nature Nanotechnology - This Review discusses recent developments in photovoltaic and light-emitting optoelectronic devices made from metal-halide perovskite materials. Skip to main content Thank

Editorial: Photovoltaic Materials and Devices 2017

Photovoltaic Materials and Devices 2017 Bhushan Sopori,1 Prakash Basnyat,2 and Srinivas Devayajanam 2 1National Renewable Energy Laboratory, 21564 Shady Lane, Idledale, CO 80453, USA 2New Jersey Institute of Technology,

138 Warren Street

Review: materials and modelling for organic photovoltaic devices

This review gives a simple and pedagogical introduction to the field of materials and their modelling for the active layer in organic photovoltaic devices. It gives a perspective on past work and a summary of the current state of the art. Given the extremely fast changes

Materials and methods for cost-effective fabrication of

The scalable and cost-effective synthesis of perovskite solar cells is dependent on materials chemistry and the synthesis technique. This Review discusses these considerations, including selecting

Editorial: Photovoltaic Materials and Devices 2017

Photoenergy on "Photovoltaic Materials and Devices" and is a very short assembly of accepted papers from a much wider submission, aimed at recent advances in materials and PV systems. ...

[Organic photovoltaic materials and devices]

Organic photovoltaic solar cells bere an important potential of development in the search for low-cost modules for the production of domestic electricity. We review the principles and techniques needed for their development: organic semiconductors, their transport

Indoor photovoltaic materials and devices for self-powered ...

The Internet of Things (IoT) is an ecosystem of devices connected together through the cloud [1]. The IoT technology is improving our daily lives from a variety of intelligent ways. For instance, we can make our lives easier, safer, and more energy-saving by creating

[Organic Photovoltaic Devices , SpringerLink]

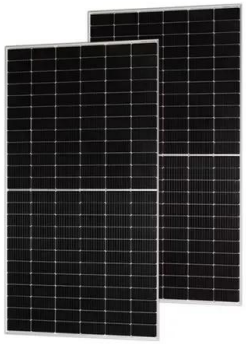
These additional demands have led to the development of a new generation of photovoltaic materials and devices. As one of the most promising emerging PV technologies, organic photovoltaics (OPVs), also known as organic solar cells, utilize synthetic organic compounds as their active components to convert solar energy.

[Photovoltaic Materials and Devices]

UN Sustainable Development Goals In 2015, UN member states agreed to 17 global Sustainable Development Goals (SDGs) to end poverty, protect the planet and ensure prosperity for all. Dive into the research topics where Photovoltaic Materials and Devices is

Perovskite Chalcogenides with Optimal Bandgap and Desired ...

Advanced Energy Materials is your prime applied energy journal for research providing solutions to today's global energy challenges. Solar cells with organic-inorganic lead halide perovskites have achieved great success and their power conversion efficiency (PCE) has reached to 22.1%.



Recent progress in thick-film organic photovoltaic devices: Materials

Corresponding Author Fei Huang Institute of Polymer Optoelectronic Materials and Devices, State Key Laboratory of Luminescent Materials and Devices, South China University of Technology, Guangzhou, 510640 P. R. China Correspondence Dr

Photovoltaic Devices: Opto-Electro-Thermal Physics ...

Thermal stability is inevitable for upscaling and commercialization of third-generation photovoltaic devices. Heat generation in solar cells directly impacts their thermal stability.

Photovoltaic Materials and Devices 2017 (Journal Article

Photovoltaic Materials and Devices 2017. Journal Article · Thu Apr 19 00:00:00 EDT 2018 · International Journal of Photoenergy. DOI: https://doi /10.1155/2018/5717323 · ...

[PDF] Efficiency Potential of Photovoltaic Materials and Devices

A selection metric to quantify the potential photovoltaic efficiency of a material is developed and is compatible with detailed balance and applicable in computational and ...

Efficiency Potential of Photovoltaic Materials and Devices ...

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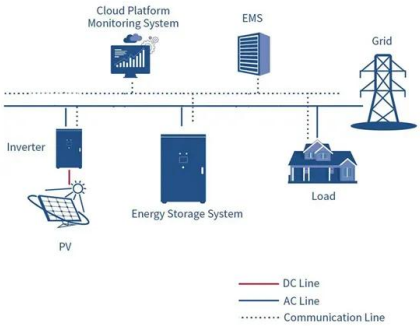
Efficiency Potential of Photovoltaic Materials and Devices ...

A consistent mathematical approach is presented that connects the Shockley-Queisser (SQ) theory to the analysis of real-world devices. We demonstrate that the external ...



Inorganic Photovoltaic Materials and Devices: Past, Present, and ...

Request PDF , On Dec 19, 2017, Aloysius F. Hepp and others published Inorganic Photovoltaic Materials and Devices: Past, Present, and Future , Find, read and cite all the research you need on

Perovskite-Inspired Photovoltaic Materials: Toward Best ...

Recently, there has been an explosive growth in research based on hybrid lead-halide perovskites for photovoltaics owing to rapid improvements in efficiency. The advent of these materials for solar applications has led to widespread interest in understanding the key enabling properties of these materials. This has resulted in renewed interest in related ...

[Photovoltaic Materials and Devices]

Off-grid PV systems for hydrogen production: From prospection analysis to system control Martinez Lopez, V. A., 2024, 177 p. Applications and Materials Science. 221, 5, 7 p., 2300820. Research output: Contribution to journal > Article > Scientific > File 59

Efficiency Potential of Photovoltaic Materials and Devices ...

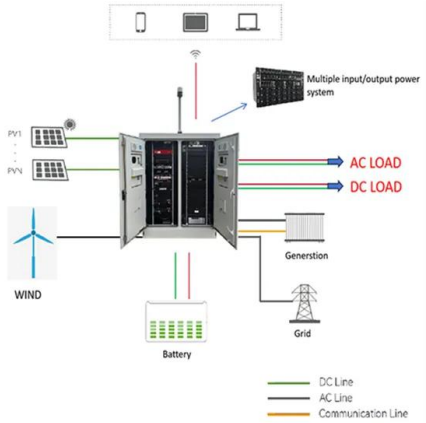
Abstract. A consistent mathematical approach is presented that connects the Shockley-Queisser (SQ) theory to the analysis of real-world devices. We demonstrate that the ...

Photovoltaic Materials and Devices 2017 , Hindawi

Photovoltaic Materials and Devices 2017 - A Special Issue published by Hindawi 1 National Renewable Energy Laboratory, Golden, USA 2 New Jersey Institute of Technology, Newark, USA

Direct Free Carrier Photogeneration in Single Layer and Stacked ...

Advanced Materials, one of the world's most prestigious journals, is the home of choice for best-in-class materials science for more than 30 years. High performance organic photovoltaic devices typically rely on type-II P/N junctions for assisting exciton dissociation.



Photovoltaic Devices: Opto-Electro-Thermal Physics and ...

Advanced Materials, one of the world's most prestigious journals, is the home of choice for best-in-class materials science for more than 30 years. An opto-electro-thermal simulation of solar cells (SCs) is presented by addressing optoelectronic and thermodynamic responses simultaneously.

[(PDF) Photovoltaic Materials and Devices 2014](#)

Photovoltaic Materials and Devices 2014 Bhushan Sopori, 1 Peter Rupnowski, 1 Sudhakar Shet, 2 and Prakash Basnyat 1 1 National Renewable Energy Laboratory, National Center for Photovoltaics, 15013

Ferroelectric Photovoltaic Materials and Devices

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 devised based on the photovoltaic effect of semiconductor p-n junctions, with their photogenerated voltage being influenced by the bandgap of the semiconductors, limiting their further ...

[(PDF) Photovoltaic Materials and Devices 2013](#)

Photovoltaic Materials and Devices 2017 April 2018 · International Journal of Photoenergy Bhushan Sopori P. Basnyat Srinivas Devayajanam View full-text Conference Paper Full-text available

Efficiency Potential of Photovoltaic Materials and Devices ...

I. INTRODUCTION. The Shockley-Queisser (SQ) theory [1] provides a definite description of the upper efficiency limit of photo-voltaic energy conversion by a single semiconductor material ...

Photovoltaic materials: Present efficiencies and future challenges

Recent developments in photovoltaic materials have led to continual improvements in their efficiency. We review the electrical characteristics of 16 widely studied ...

Recent Progress in Materials and Device Design for ...

1 Introduction Photovoltaics offer a clean and renewable alternative to fossil-based sources of electricity. It will continue to increase its share in global electricity production because of increased concerns about global warming and environmental pollution. [1, 2] Lab-level efficiencies of various solar cell technologies have improved considerably in the last few years with record power

Photovoltaic materials: Present efficiencies and future challenges

Recent developments in photovoltaic materials have led to continual improvements in their efficiency. Atwater H. A., Polman A., Plasmonics for improved photovoltaic devices. Nat. Mater. 9, 205-213 (2010). 10.1038/nmat2629 Crossref PubMed Web of ...

Luminescence spectroscopy of lead-halide perovskites: materials

Research on solution-processed lead-halide perovskites is on the rise due to their highly anticipated applications as photonic devices. These perovskites exhibit strong band-to-band luminescence even at room temperature, resulting in high energy-conversion efficiencies for solar cells and light-emitting diod

Photovoltaic materials and devices 2016

Photovoltaic energy continues to grow with about 59 GW of solar PV installed in 2015. While most of the PV production (about 93%) was Si wafer based, both CdTe and CI(G)S are growing in their shares. There is also continued progress at the laboratory scale in

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