Development of new dielectric solar container materials

Are photo imageable dielectric materials suitable for Next-Generation packaging?
Abstract: The demand of photo imageable dielectric materials performance for next-generation packaging requires various properties,not only good electrical property but also high lithography resolution and low stress of the film. We have developed polyimide materials,that meet each of those new requirements.

What is a nanomaterial based on a polar dielec?
Artificial electromagnetic media,or metamaterials,based on metallic or polar dielec. nanostructures can provide many of these properties by coupling light to free electrons (plasmons) or phonons (phonon polaritons),resp.,but at the inevitable cost of significant energy dissipation and reduced device efficiency.

Does selenium substitution improve dielectric constant of non-fullerene acceptors?
Dielectric constant of non-fullerene acceptors plays a critical role in organic solar cells in terms of exciton dissociation and charge recombination. Here,authors report selenium substitution on central core of acceptors to improve dielectric constant,realizing devices with efficiency of 19.0%.

Why is dielectric function important?
The dielectric function is a fundamental property of materials, governing their optical response, electronic excitations, and screening behavior. Accurate knowledge of dielectric function is particularly critical for the design and optimization of optoelectronic devices, photovoltaic and solar cell materials [1, 2, 3, 4, 5].

How do we predict dielectric function d () of a material structure?
Our models for predicting the dielectric function D (?) of a given material structure are built using the Atomistic Line Graph Neural Network(ALIGNN) framework . This framework allows a neural network to operate on a non-Euclidean graph representing the crystal.

What is the dielectric constant of non-fullerene acceptors?
Provided by the Springer Nature SharedIt content-sharing initiative Dielectric constant of non-fullerene acceptors plays a critical role in organic solar cells in terms of exciton dissociation and charge recombination. Current acceptors feature a dielectric constant of 3-4,correlating to relatively high recombination loss.

The results indicate that lead-free dielectric materials with large maximum polarization, high breakdown electric field, small remnant polarization, and slim polarization-electric field loops are more ...

The novel materials like elastomer composites and polymer blends have shown great advantages over the commercially available dielectric ...

Through a comprehensive survey of materials utilized in modern solar panels, this paper provides insights into

the current state of the field, ...

This contributed volume overviews the synthesis of emerging nanodielectric materials and examines their use in energy storage applications.

In this context, it is very meaningful to develop novel high dielectric constant materials and to disclose the potential obstacles before converting high dielectric constants to high performance ...

The demand of photo imageable dielectric materials performance for next-generation packaging requires various properties, not only good electrical property but

In this work, we develop an ALIGNN-based framework specifically designed to predict the dielectric function of insulating materials. The model is trained on the JARVIS-TB-mBJ dataset, ...

Here, authors report selenium substitution on central core of acceptors to improve dielectric constant, realizing devices with efficiency of 19.0%.

Although the dielectric constant of the most LMAP varies from 2 to 8 at 25 °C and 27.12 MHz (Nelson and Noh, 1992), it is difficult to find available materials to exactly match the dielectric ...

However, with the growing demand for high efficiency and miniaturization, the low energy storage density of dielectric capacitors has become a barrier to their further development [24]. ...

Chemical similarity analysis has revealed structural resemblances among selected polymers. This work is based on a rapid framework that has ability to design novel polymers for ...

The 2-D semiconductors have been recognized as promising channel materials for the ultimately scaled transistor technologies beyond silicon. An essential technology enabler for 2-D ...

Furthermore, high-temperature dielectric materials have emerged as a new and important topic. Li et al. provided important guidance for the development of heat-resistant polymer ...

The authors present organic photovoltaic mini-modules comprising 5024 individual sub-cells on an area of 3.8 × 3.9 cm2 with voltages up to more than 5000 V and efficiencies up to ...

Photo-sensitive dielectric materials applicable to advanced organic interposers are desired to realize cost-effective semiconductor packages equipped with fine patterning capability. In ...

Here, the development and integration of an ultrathin dielectric/metal/dielectric (DMD) structure as a transparent electrode for bifacial perovskite and organic solar cells is reported.

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Abstract High performance organic solar cells (OSCs) are usually realized by using post-treatment and/or additive, which can induce the formation ...

The atomically thin nature of 2D materials imparts exceptional flexibility and transparency, paving the way for the development of lightweight and flexible solar cells with ...

The currently low relative dielectric constant (?r) of organic semiconductors suppress the separation of hybrid local exciton-charge transfer states, which is a key factor limiting the future ...

Although in literature, the researcher has proposed number review articles about dielectric materials and its applications. The classification of ...

This paper describes the development of the dielectric-coated metal-integrated solar panel, which is lightweight and can be used as an alternative roofing material, which can harvest ...

Riebesell et al. propose a high-throughput workflow combining machine learning, computational simulations, and experimental synthesis to ...

The development of low-temperature solid oxide fuel cells (LT-SOFCs) is of significant importance for realizing the widespread application of SOFCs. This has stimulated a substantial ...

Dielectric elastomers (DEs) have emerged as one of the most promising artificial muscle technologies, due to their exceptional properties such ...

1. Introduction Dielectric materials find wide usages in microelectronics, power electronics, power grids, medical devices, and the military. Due to the vast demand, the development ...

Figure 2 illustrates selected examples of dielectric permittivities and absorption spectra of relevant materials for solar energy conversion ...

Abstract With the fast development of the power electronics, dielectric materials with high energy-storage density, low loss, and good temperature stability are eagerly desired for the ...

Dielectric ceramics are materials characterized by their ability to store electric energy, often utilized in the form of solid solutions, composites, films, and multilayer ceramic capacitors, and are essential for ...

High-temperature latent thermal storage system for solar power: Materials, concepts, and challenges Alok K. Ray, Dibakar Rakshit, K. Ravikumar Show more Add to Mendeley

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High-power energy storage systems have important applications in electrical grid, electric vehicles, nuclear, aerospace, telecommunication, military, defense and medical fields. The ...

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Perovskite materials have emerged as one of the most promising classes of compounds in recent years due to their unique combination of ...

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