Polymer-based solar cells

What is a polymer solar cell?

The first polymer solar cell is made of mixed poly [2-methoxy-5- (2?-ethylhexyloxy)-p-phenylene vinylene] (PPV), C60, and its numerous variants with high energy conversion efficiency . This technique contributed to a further increase in the age of polymer products for the capture of solar energy.

What is a polymer solar cell (PSC)?

Polymer solar cell (PSC),also called organic photovoltaic solar cell (OPV),is an emerging solar cell,benefitting from recent advances in nano-structured and functional energy materials and thin films,making it a cutting edge applied science and engineering research field.

What are all-polymer solar cells?

All-polymer solar cells (all-PSCs) consisting of polymer donors (PD s) and polymer acceptors (PA s)have drawn tremendous research interest in recent years.

Are solar cells a polymer or organic material?

Solar cells utilizing organic materialas the dynamic layer changing over a photon stream into an electron stream have been known and revealed for a long while [143-145]while the term polymer,solar cells is generally later with a history that basically length the primary decade of the new centuries .

Are polymer solar cells a promising energy technology for the future?

As a promising energy technology for the future,polymer solar cells have improved remarkably in recent years and power conversion efficiencies of up to 6.5% were reported for small area devices (1-10 mm 2) (Kim et al.,2007). Unfortunately,these values have not yet been sustained for the long lifetimes needed for commercial maturity.

Are polymer-based solar cells photovoltaic?

Table 2.5. Photovoltaic properties of polymer-based solar cells . Two-dimensional conjugated polymers named PBDTT-4S-TT and PBDTT-4S-BDD were fabricated and synthesized using a benzo [1,2-b:4,5-b?] dithiophene unit with 4-methylthio substituted thiophene side chains.

According to this study, organic solar cells (OPV) with polymers in the active layers are more prominent concerning power conversion efficiency associated with ...

Presently, the new generation of solar cells--the third-generation photovoltaics based on nanocrystals, polymers, dyes, perovskites, and organic materials--is a highly flourishing field in solar energy research [].Even though the achieved power conversion efficiency and stability are low in most cases, third-generation solar cells are renowned due to their ...

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All-polymer solar cells (all-PSCs), based on the bulk heterojunction (BHJ) active layers composed of a p-type conjugated polymer donor and an n-type conjugated polymer acceptor, have attracted ...

All-polymer solar cells (all-PSCs) have attracted significant research attention in recent years, primarily due to their advantages of outstanding photo-thermal stability and excellent mechanical flexibility. However, all-PSCs typically exhibit complex morphologies during the film formation of blend films, primarily due to the tendency to become entangled in polymer chains, ...

We discuss polymer-based solar cells, paying particular attention to device design and potential improvements. Common materials used in polymer photovoltaics. From left to right, PCBM: (6,6 ...

All the polymer solar cells based on the three cyano-substituted conjugated polymers showed high open-circuit voltages (V oc) greater than 0.89 V, and the highest power conversion efficiency of 4.59% was obtained from the device based on PB-BtCN with a V oc of 0.93 V, short-circuit current of 7.36 mA cm -2, and fill factor of 67.1%.

We investigate the industrial viability of highly efficient organic solar cells (OSCs) based on several representative non-fullerene acceptors (NFAs) by taking into consideration the three essential parameters: power conversion efficiency, photo-stability, and materials cost. End-group and side-chain modifications of NFAs strongly influence long-term photo-stability. Promising ...

All-polymer solar cells (all-PSCs) consisting of polymer donors (PDs) and polymer acceptors (PAs) have drawn tremendous research interest in recent years. It is due to not only their tunable optical, electrochemical, and ...

Solution-processed polymer solar cells (PSCs) have attracted dramatically increasing attention over the past few decades owing to their advantages of low cost, solution ...

There has been rising interest followed by extensive research on organic and polymer solar cells in the last three decades. Organic semiconductors have made great strides since conductivity [1] and electroluminescence [2] in Anthracene were studied in the 1960s by Kallmann and his group. ... " Polymer-based Solar Cells ". Materials Today 10 ...

Despite the significant progresses made in all-polymer solar cells (all-PSCs) recently, the relatively low short-circuit current density (Jsc) and large energy loss are still quite difficult to overcome for further development. ...

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