Graphene electrodes for solar cells

A highly flexible and durable transparent graphene electrode with thermal stability was developed via the direct integration of polyimide (PI) on graphene. Due to the high transparency of PI-integrated graphene electrode and intimate contact between graphene and PI substrate, high-efficiency flexible organic solar cell with a PCE of 15.2% and outstanding mechanical ...

Graphene has shown tremendous potential as a transparent conductive electrode (TCE) for flexible organic solar cells (OSCs). However, the trade-off between electrical conductance and transparency as well as surface roughness of the graphene TCE with increasing layer number limits power conversion efficiency (PCE) enhancement and its use for ...

Large sheets of transparent graphene that could be used for lightweight, flexible solar cells or electronics displays can now be created using a method developed at MIT. The technique involves a buffer layer of parylene for the graphene transfer process.

Transparent, conductive, and ultrathin graphene films, as an alternative to the ubiquitously employed metal oxides window electrodes for solid-state dye-sensitized solar cells, are demonstrated. These graphene films are fabricated from exfoliated graphite oxide, ...

There has been tremendous research progress among scientists in the development of hybrid solar cells (HSC) as green solar energy. The research aims to investigate the influence of several types of transparent conductive electrodes on the performance of fabricated HSC. Single-layer graphene (SG)-based film has been identified as a potential ...

Imagine a future in which solar cells are all around us--on windows and walls, cell phones, laptops, and more. A new flexible, transparent solar cell developed at MIT brings that future one step closer. The device ...

As the ideal transparent electrode for solar cell, the requirements of high transparency, low sheet resistance, robust chemical stability, and low cost should be simultaneously fulfilled. To date, amounts of transparent conductive materials such as graphene [75], [76], [77], carbon nanotubes (CNTs) [78], [79], conductive polymers [80], [81], metallic ...

Superflexible, high-efficiency perovskite solar cells utilizing graphene electrodes: towards future foldable power sources

The efficiency of organic solar cells with graphene electrode was 1.18%, which is close to that of organic solar cells with ITO electrode (~1.27%). In 2011, Wang et al. (2011a) used layer-by-layer transfer method to fabricate multilayer CVD graphene films with less defects and lower sheet resistance. The organic solar cells

with the electrode of four layers graphene ...

Graphene has shown tremendous potential as a transparent conductive electrode (TCE) for flexible organic solar cells (OSCs). However, the trade-off between electrical conductance and transparency as well as surface roughness of the graphene TCE with increasing layer number limits power conversion efficiency (PCE) enhancement and its use for large-area ...

A new flexible, transparent solar cell developed at MIT brings that future one step closer. The device combines low-cost organic (carbon-containing) materials with electrodes of graphene, a flexible, transparent material made from inexpensive, abundant carbon sources. This advance in solar technology was enabled by a novel method of moving a ...

This chapter focuses mainly on the graphene preparation methods, and the fabrication of graphene-based thin films as well as their utilization as back contacts, transparent conductive...

Transparent, conductive, and ultrathin graphene films, as an alternative to the ubiquitously employed metal oxides window electrodes for solid-state dye-sensitized solar cells, are demonstrated. These graphene films are fabricated from exfoliated graphite oxide, followed by thermal reduction. The obtained films exhibit a high conductivity of 550 S/cm and a ...

As a conductive electrode, graphene is a promising substitute for commercial ITO leading to flexible solar cells. Graphene-based materials are also capable of functioning as charge selective and transport components in solar cell buffer layers. Moreover, low air stability and atmospheric degradation of the photovoltaic devices can be improved ...

In the last decade, graphene has been spotlighted as one of the novel materials for transparent conductive electrodes (TCEs) of solar cells. This paper provides an overview of recent progress for ...

Transparent, conductive, and ultrathin graphene films, as an alternative to the ubiquitously employed metal oxides window electrodes for solid-state dye-sensitized solar cells, are demonstrated. These graphene films are fabricated from exfoliated graphite oxide, followed by thermal reduction.

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