The role of the buffer layer of photovoltaic cells

Are buffer layers useful in polymer solar cells?
The present review rationalizes the information spread in the literature concerning the use and role of buffer layers in polymer solar cells. Usual device structures include buffer layers, both at the anode and at the cathode interface, mainly to favour charge collection and extraction, but also to improve the device's overall performance.

Why do we need a buffer layer for organic solar cells?
Buffer layers are actually essential for achieving highly efficient polymer solar cellsand can no more be considered as "optional",thus the need and...TiOx has been widely used as buffer layer to improve the efficiency and stability of organic solar cell. This paper presents the effect of polyethylene glycol on the properties of organic solar...

Why are buffer layers important?
Buffer layers are actually essential for achieving highly efficient polymer solar cellsand can no more be considered as "optional",thus the need and importance of understanding their properties and role.

How are polymer-based photovoltaic cells fabricated?
Polymer-based photovoltaic cells have been fabricated by inserting a thin,transparent,transition metal oxide layerbetween the transparent anode (indium tin oxide) and the polymer layer. Two...

Does interfacial layer enhance efficiency of polymer solar cells?
Li, C.-Z. et al. Effective interfacial layer to enhance efficiency of polymer solar cells via solution-processed fullerene-surfactants. J. Mater. Chem. 22, 8574 (2012). Vandewal, K., Tvingstedt, K., Gadisa, A., Inganas, O. & Manca, J. V.

Can polyethylene glycol be used as electron buffer layer?
Zhang, Z.-G. et al. Poly (ethylene glycol) modified fullerene as electron buffer layer for high-performance polymer solar cells. Appl. Phys. Lett. 102, 143902 (2013). Zhou, Y. et al. A Universal Method to Produce Low-Work Function Electrodes for Organic Electronics. Science 336, 327-332 (2012).

This approach can help improve the performance of wide-gap CIGS solar cell devices using other buffer layers (such as Zn(O,S) and Zn(Mg,O)). Our analysis revealed that when the doping concentration of a ...

The role of buffer layers in polymer solar cells. Energy Environ. Sci. 4, 285 (2011). [Google Scholar] ... Uehara K. & Yoshikawa S. High performance polythiophene/fullerene bulk-heterojunction solar cell with a TiOx hole blocking layer. Appl. Phys. Lett. 90, 163517 (2007). [Google Scholar] Qi B. & Wang J. Fill factor in organic solar cells ...

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This study proposed and analyzed a competent and economic CZTS solar cell structure (graphene/MoS2/CZTS/Ni) with MoS2 and graphene as the buffer and TCO layers, ...

Abstract. This article provides an overview of the design, fabrication and characterization of the most widely used cathode buffer layers (CBLs) constructed using pristine zinc oxide ...

Nanoscale imaging and analysis has provided new insight into the role of ZnTe buffer layers on CdTe device performance and stability. It is shown that significant CdTe-ZnTe ...

Cu 2 O/TiO 2 heterojunction solar cells have bright prospective for application in photovoltaics. The low power conversion efficiency of these cells, though, is a matter of concern. In the present work, solar cells with Cu 2 O/TiO 2 heterojunction have been analysed using software Solar Cell Capacitance Simulator (SCAPS). The effect of thickness of absorber layer ...

Furthermore, several groups reported the dependence of the photovoltaic performance on light intensity in solid state dye-sensitized solar cells (ss-DSSC) and a nonlinear photo-response indicated in low light intensities (Searson et al., 1996, Goossens and Van der Zanden, 2000, Graetzel et al., 1990).The mesoporous (mp) TiO 2 layer in ss-DSSC acted as ...

Note that, in general, the structures of all photovoltaic cells with a lateral heterojunction include an anode, a hole-selective layer (HSL), layers of electron donor and electron acceptor ...

Bathocuproine (BCP) buffer layer has been commonly used in inverted p-i-n perovskite solar cells (PSCs) for high performance, but its working mechanism has not been thoroughly elucidated. Here, a series of devices have been ...

The short-wavelength response for traditional CdS/CdTe thin film solar cells was dramatically restricted by the CdS window layer. In order to increase short-wavelength light collection, we tried to replace CdS with Mg x Zn 1-x O (MZO). The short-wavelength quantum efficiency (QE) response was obviously increased to more than 80% at 400 nm, while fill factor ...

Incorporating MoSe 2 as a buffer layer thus plays a crucial role in improving the overall efficiency and

effectiveness of the solar cell device. Table 2 Lattice mismatch at CFTSe/buffer interface ...

The role of bathocuproine (BCP) buffer layer inserted between active layer and Al contact in photovoltaic cells based on phthalocyanine (Pc) and C60 was investigated. Photoluminescence (PL) experiments show exciton quenching at the C60-Al interface to be strongly reduced by inserting BCP. Current-voltage characteristics of photovoltaic cells with ...

The solar cell performance was measured under simulated AM1.5 radiation using a commercial tool that is calibrated using a certified silicon standard (PV Measurements). ... Nanoscale imaging and analysis has provided new insight into the role of ZnTe buffer layers on CdTe device performance and stability. It is shown that significant CdTe ...

Buffer layers are commonly used in the optimization of thin-film solar cells. For CuInSe 2-and CdTe-based solar cells, multilayer transparent conductors (TCOs, e.g., ZnO or SnO 2) are generally used in conjunction with a CdS heterojunction layer.Optimum cell performance is usually found when the TCO layer in contact with the CdS is very resistive or almost insulating.

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