



Thin-film solar cell back electrode

From the optical properties, we estimate the band-gap energy of this thin film as 1.45-1.6 eV which is quite close to the optimum value for a solar cell. By using this thin film as an absorber ...

In this work, a heterogeneous thin film solar cell with a FTO/TiO₂/n-ZnSe/p-CdTe/Ag: ZnSe/Ni structure was designed and analyzed by using a SCAPS 1-D simulator program under AM 1.5 G illumination. In this configuration, FTO, TiO₂, ZnSe, CdTe, and Ni act as the front electrode, the window layer, the buffer layer, the light-absorbing layer, and the back electrode, respectively.

In the initial simulation, GeSe based solar cells with and without NiO BSF layer have been simulated and analyzed, and the J-V curves are shown in Fig. 2 (a). It is easy to see that the overall output parameters of the proposed GeSe based solar cell with NiO BSF layer are higher than that of the conventional GeSe based solar cell without NiO BSF layer.

This novel dual-functional back contact structure could also be introduced into other thin film solar cells for their efficiency improvement. About. Cited by ... A novel p-type and metallic dual-functional Cu-Al₂O₃ ultra-thin layer as the back electrode enabling high performance of thin film solar cells Q. Lin, Y. Su, M. Zhang, X ...

Back Interface Engineering by Designing Core-Shell Structured Mesoporous Carbon Spheres Counter Electrode in Thin Film Solar Cells. 31 Pages Posted: 4 Jul 2024. See all articles by Chang Xu ... This work is expected to offer a feasible pathway for exploring cheap counter electrode and back interface engineering to accelerate mass and carrier ...

In the present work, a thin film of Sn metal, instead of aluminum, was deposited as a back electrode, using thermal evaporation, for fabricating organic solar cells composed of poly(3-hexylthiophene) and [6,6]-phenyl-C₇₁ butyric acid methyl ester. The effect of post-thermal annealing on performance parameters of the solar cell was investigated at low temperatures ...

In order to improve the conversion efficiency of the solar cell, the ZnO/Ni multilayer thin film used in back electrode was prepared through the electroless plating and sol-gel methods.

The passage of light through the thin-film device structure requires transparent contact at the front and back sides of the device. Typically, transparent contacts are made of wide ... we presented the first report for the perovskite solar cell with an ITO back electrode deposited by ion-beam sputtering directly on the C 60 ETL. We analyzed the ...

In order to improve the conversion efficiency of the solar cell, the ZnO/Ni multilayer thin film used in back electrode was prepared through the electroless plating and sol-gel methods. The morphology, structure and resistivity of the electroless nickel coating were measured by scanning electron microscopy, X-ray diffraction,



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and four-point ...

1 Introduction. Silver provides the highest electrical conductivity among all metals and offers attractive plasmonic properties. [] Ag thin-films serve a number of applications, such as optical reflectors [] or as electrodes in various thin-film devices. [] Ultra-thin yet percolated Ag films are used as semitransparent electrodes that afford light in- or outcoupling in solar cells ...

US 2004/014419 A1 seeks to provide a thin-film solar cell whose molybdenum back electrode layer has improved efficiency. This is to be achieved by providing a glass substrate with a...

This work reports for the first time to find an appropriate p-type conductive semiconductor film, digenite Cu₉S₅ nanocrystalline film, as the back electrode for CdTe solar cells as the model device, and believes it could also act as the back electrode for other thin film solar cells, for their performance improvement. Thin film solar cells, due to the low cost, high ...

Here, we study in-depth the antireflection and filtering properties of ultrathin-metal-film-based multilayer transparent electrodes (MTEs) integrated in thin-film solar cells, ...

The transparent conductor (TC) layer in thin film solar cell modules has a significant impact on the power conversion efficiency. Reflection, absorption, resistive losses and lost active area ...

Cu₂ZnSn(S,Se)₄ (CZTSSe) thin film deposited on flexible Mo foil substrate has advantage of high mass specific power and good ductility. However, a thick Mo(S,Se)₂ interface layer is easily to be ...

Due to the recent surge in silicon demand for solar modules, thin-film photovoltaic (PV) modules have a potential to penetrate the market in significant numbers. As an alternate candidate, thin film technologies in PVs have the ability to achieve better performance. The competing thin-film PV technologies have the flexibility to adapt to any sort of curvature ...

The ZnO/Ni multilayer thin film could be used in back electrode for solar cell and will enhance the properties of the solar cell. Acknowledgments This work was supported by the Scientific and Technological Program in Shandong Province of China (No. 2010G0020318), Shandong Education Bureau Project (No. J12LA12), and Scientific and ...

This article presents the optimization of Zinc Tin Oxide/Silver/Zinc Tin Oxide (ZTO/Ag/ZTO) multilayers to implement them in thin film solar cells as transparent electrodes. To achieve improvements on the performance of these transparent multilayers, effect of Ag and ZTO thicknesses, and position of Ag layer within the multilayer were investigated. Electrical and ...

A comprehensive review of back contact material performance when used in thin film CdTe-based solar cells is given. Back contacts are one key component in improving the efficiency and stability of th...



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Thin film solar cells based on cadmium telluride (CdTe) are complex devices which have great potential for achieving high conversion efficiencies. Lack of understanding in materials issues and device physics slows down the rapid progress of these devices. This paper combines relevant results from the literature with new results from a research programme ...

Bifacial perovskite solar cells have shown great promise for increasing power output by capturing light from both sides. However, the suboptimal optical transmittance of back metal electrodes ...

With the rapid development of perovskite solar cells (PSCs), lowering fabrication costs for PSCs has become a prominent challenge for commercialization. At present, gold is commonly used as the back metal electrode in state-of-the-art n-i-p structured PSCs due to its compatible work function, chemical inertness, and high conductivity. However, the high cost of ...

In order to improve the conversion efficiency of the solar cell, the ZnO/Ni multilayer thin film used in back electrode was prepared through the electroless plating and ...

Finally, SHJ solar cells with plating copper electrode and double-sided indium-based transparent electrodes halved were prepared, and a certified efficiency of 25.94% (total area of 274.4 cm²) was ...

In this paper, we present the integration of combined front and back 1D and 2D diffraction gratings with different periods, within thin film photovoltaic solar cells based on crystalline silicon layers. The grating structures have been designed considering both the need for incident light absorption enhancement and the technological feasibility. Long wavelength absorption is increased thanks ...

When it comes to parasitic absorption in thin-film silicon solar cells, most studies focus on one electrode only, most of the time the substrate (in n-i-p configuration) or superstrate (in p-i-n configuration). We investigate here simultaneously the influence of the absorption in both front and back electrodes on the current density of tandem micromorph solar cells in p-i ...

DOI: 10.1016/j.solener.2020.02.033 Corpus ID: 214031747; Influence of WSe₂ buffer layer at back electrode on performance of Cu₂ZnSn(S,Se)₄ solar cells @article{Zhang2020InfluenceOW, title={Influence of WSe₂ buffer layer at back electrode on performance of Cu₂ZnSn(S,Se)₄ solar cells}, author={Xiao-hui Zhang and Bin Yao and ...

In this document, we briefly reviewed thin-film solar cell technologies including a-Si, CIGS, and CdTe, commencing with the gradual development of the corresponding technologies along with their structural ...

Solution-processed solar cells are appealing because of the low manufacturing cost, the good compatibility with flexible substrates, and the ease of large-scale fabrication. Whereas solution-processable active materials have been widely adopted for the fabrication of organic, dye-sensitized, and perovskite solar cells,



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vacuum-deposited transparent conducting ...

Improving the Back Electrode Interface Quality of $\text{Cu}_2\text{ZnSn}(\text{S},\text{Se})_4$ Thin-Film Solar Cells Using a Novel CuAlO_2 Buffer Layer Yanping Song,+? Bin Yao,*,+? Yongfeng Li,*,+? Zhanhui Ding,+? Ruijian Liu,+? Yingrui Sui,§ Ligong Zhang,# Zhenzhong Zhang,# and Haifeng Zhao# +State Key Lab of Superhard Materials, College of Physics and ?Key Laboratory of Physics and ...

Yoshikawa, K. et al. Exceeding conversion efficiency of 26% by heterojunction interdigitated back contact solar cell with thin film Si technology. Sol. Energy Mater.

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