Orthogonal thin film photovoltaics on vertical nanostructures

Orthogonal photovoltaic devices are core-shell type structures consisting of thin film photovoltaic stack on vertical nanopillar scaffolds. These types of devices allow charge collection to take ...

Nanostructured photovoltaics has attracted an enormous amount of attention in recent years owing to its potency for significant device performance enhancement over the conventional technologies. Nonetheless, conventional fabrication approaches for nanostructured scaffolds rely on glass or silicon substrates which are costly, brittle and have limited scalability. ...

Large scale, flexible and three-dimensional quasi-ordered aluminum nanospikes for thin film photovoltaics with omnidirectional light trapping and optimized electrical design (2014) Siu-Fung Leung et al. Energy & Environmental Science

This Review discusses some of the recent developments in the design and implementation of such photonic elements in thin-film photovoltaic cells. to be more effective 5. ... 10.1038/NMAT3921 Light management for photovoltaics using high-index nanostructures Mark L. Brongersma1*, Yi Cui1,2 and Shanhui Fan3 High-performance photovoltaic cells use ...

Orthogonal photovoltaic devices are core-shell type structures consisting of thin film photovoltaic stack on vertical nanopillar scaffolds. These types of devices allow charge collection to take place in the radial direction, perpendicular to the path of light in the vertical direction. This approach addresses the inherently high recombination ...

Efficient broadband light manipulation is a crucial ingredient for high-performance photovoltaics [1] as well as in LEDs, photodetectors and optoelectronic devices [2], [3] in general. Focusing our attention on thin film photovoltaic and photonic devices, the reduced thickness of the active absorber layers is beneficial against light-induced degradation and allows cheap and ...

Orthogonal Thin Film Photovoltaics on Vertical Nanostructures. Article. ... Orthogonal photovoltaic devices are core-shell type structures consisting of thin film photovoltaic stack on vertical ...

It consists of thin film photovoltaic devices grown on an array of vertically aligned nanopillars [6, 7] and other vertical nanostructures such as spikes [8, 9]. Here, decoupling of photogenerated ...

Decoupling paths of carrier collection and illumination within photovoltaic devices is one promising approach for improving their efficiency by simultaneously increasing light absorption and ...

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Thin films are basic components of many types of optoelectronic devices such as thin-film solar cells, planar light-emitting diodes, and photodetectors. The preparation of nanostructured films can optimize the photoelectric properties of the films, improving the performance of optoelectronic devices, and has, therefore, received intense research ...

Download scientific diagram | SEM image of solar cell with orthogonal pillars consisting of vertical array of CNT coated with a-Si:H solar cell. The size effect of the CNT leads to an electric ...

Oriented semiconductor nanostructures and thin films exhibit many advantageous properties, such as directional exciton transport, efficient charge transfer and separation, and optical anisotropy ...

This suggests that the orthogonal solar cells are better suited for devices with minimal recombination losses from publication: Orthogonal Thin Film Photovoltaics on Vertical Nanostructures ...

Orthogonal Thin Film Photovoltaics on Vertical Nanostructures ... Green MA (2002) Third generation photovoltaics: solar cells for 2020 and beyond. Phys E Low-Dimens Syst Nanostructures 14:65-70. doi: 10.1016/S1386-9477(02)00361-2 ... Tsui K-H, Lin Q et al. (2014) Large scale, flexible and three-dimensional quasi-ordered aluminum nanospikes ...

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Orthogonal Thin Film Photovoltaics on Vertical Nanostructures. A. Ahnood Hang Zhou +4 authors G. Amaratunga. Engineering, Materials Science ... This work considers effects which influence the performance of orthogonal photovoltaic devices, and addresses the inherently high recombination rate of disordered thin films, by allowing semiconductor ...

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Figure 1a illustrates this point with a schematic of a prototypical thin PV cell with a light-trapping layer consisting of high-index nanostructures. Specifically, it shows a 1-um-thick c-Si film ...

A photodiode consisting of nanopillars of thin-film silicon p-i-n on an array of vertically aligned carbon nanotubes (CNTs) with a noncontinuous cathode electrode is demonstrated, which exploits the intrinsic enhancement of the CNTs" electric field, which leads to reduction in the photodiodes" operating voltage and

response time and enhancement of optical ...

NANO EXPRESS Open Access Orthogonal Thin Film Photovoltaics on Vertical Nanostructures Arman Ahnood1*, H. Zhou2, Y. Suzuki3, R. Sliz4, T. Fabritius4, Arokia Nathan5 and G. A. J. Amaratunga5 Abstract Decoupling paths of carrier collection and illumination within photovoltaic devices is one promising approach for

Fabrication of Vertical Array CNTs/Polyaniline Composite Membranes by Microwave-Assisted In Situ Polymerization. ... Anisotropic Terahertz Emission from Bi 2 Se 3 Thin Films with Inclined Crystal Planes. Sun Young Hamh; Soon-Hee Park; ... Orthogonal Thin Film Photovoltaics on Vertical Nanostructures. Arman Ahnood; H. Zhou;

This approach addresses the inherently high recombination rate of disordered thin films, by allowing semiconductor films with minimal thicknesses to be used in photovoltaic devices, ...

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