Germanium silicon thin film solar cells

Do thin-film silicon solar cells have a strong electric field?
For all types of p-i-n- and n-i-p-type thin-film silicon solar cells,it is of paramount importance to have a strong internal electric fieldand to avoid substantial reduction of this field by any of the effects listed earlier.

What are thin-film solar cell technologies based on Si?
Thin-film solar cell technologies based on Si with a thickness of less than a few micrometerscombine the low-cost potential of thin-film technologies with the advantages of Si as an abundantly available element in the earth's crust and a readily manufacturable material for photovoltaics (PVs).

Can thin-film silicon solar cells be deposited on stainless steel?
Deposition of thin-film silicon solar cells on stainless steel has the advantage of being relatively straightforward. Increasingly one attempts to use polymers as substrates. Here solar cell deposition is more difficult,because it is impaired by outgassing from the polymer and by temperature limitations of the latter.

What are thin film solar cells?
... Thin film solar cells are a promising approach for terrestrial and space photovoltaicsand offer a wide variety of choices in terms of the device design and fabrication,but it would surely be determined by the simplicity of manufacturability and the cost per reliable watt.

How can silicon thin film solar cells be used in industrial applications?
For the industrial application of silicon thin film solar cells,the current focus is on how to realize high-efficiency low-cost production process and minimize light-induced degradation effect,thus effectively reducing the balance-of-system (BOS) costs of system integration.

How thick is a single-junction thin-film silicon solar cell?
Sketch (not drawn to scale) showing basic structure of a single-junction thin-film silicon solar cell in the "superstrate configuration." The thickness of the glass-TCO combination is basically determined by the glass thickness,ranging from 0.5 to 4 mm,whereas the TCO layer thickness is typically around 1 µm.

In this review article we have studied about types of a-Si SC namely hydrogenated amorphous silicon (a-Si:H) SC and hydrogenated amorphous silicon germanium (a-SiGe:H) SC. This article also reviews about ...

In this study, we report an appreciably increased efficiency from 6% up to 9.1% of hydrogenated amorphous silicon germanium (a-SiGe:H) thin film solar cells by using a combination of different p-doped window layers, such as boron doped hydrogenated amorphous silicon (p-a-Si:H), amorphous silicon oxide (p-a-SiO x:H), microcrystalline silicon (p-µc-Si:H), ...

Over the past four decades, thin-film silicon solar cells have been recognized as one of the cost-effective

alternative candidates to crystalline silicon solar cells because of several advantages such as lower consumption of raw material, scalability for mass-production, and application to light-weight flexible modules. Research and development have started since the ...

Mixed-phase hydrogenated silicon oxide (SiO x:H) is applied to thin-film hydrogenated amorphous silicon germanium (a-SiGe:H) solar cells serving as both p-doped and n-doped layers. The bandgap of p-SiO x :H is adjusted to achieve a highly-transparent window layer while also providing a strong electric field.

Amorphous silicon germanium (a-SiGe) alloys have widely been used as the absorption layer of the middle or/and bottom cells in multi-junction thin film solar cells. Their optical band gap (E g) shifts to lower energies with increasing germanium content, which aims to make a suitable and narrow band gap a-SiGe material of the solar ...

A high efficiency of 9.10% has been achieved by double p-SiOx layers for a ...

This thesis represents a systematic study of amorphous silicon ...

Hydrogenated amorphous silicon germanium (a-SiGe:H) is a mean-ingful building block in multi ...

Amorphous silicon-germanium (a-SiGe) solar cells with graded Ge fraction along the film depth profile are deposited at elevated rate of 4 Å/s in a pressure range of 2-4 Torr.

We introduce a novel germanium-on-nothing (GON) technology to fabricate ultrathin Ge films for lightweight and thin GaAs solar cells. GON membranes formed by reorganization of cylindrical pores during annealing enable the growth and transfer of GaAs cells and substrate reuse. Compared with previous porous Ge studies, we significantly improve the ...

Thin microcrystalline silicon-germanium films (u-Si l.x Ge x :H) prepared by PECVD at 95 MHz have been investigated. The optical absorption of these films increases in the infrared spectral region with increasing germanium content. In addition to the shift of the indirect gap an increase of the absorption coefficient above the band edge is observed. The material shows high ...

Finally thin-film polysilicon solar cells, with grain size in the micrometer range, has recently emerged as an alternative photovoltaic technology. The layers have a grain size ranging from...

Thin film solar cell along with enhanced absorption property will be the best, so combination of ...

This thesis represents a systematic study of amorphous silicon microcrystalline silicon and germanium thin films, and a-Si:H thin film solar cells fabricated using an OPT plasma lab 100 RF PECVD... We provide a review and analysis of research on crystalline silicon thin-film solar cells (CSiTFSCs) on ceramic substrates.

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This chapter covers the current use and challenges of thin-film silicon solar cells, including conductivities and doping, the properties of microcrystalline silicon (the role of the internal electric field, shunts, series resistance problems, light trapping), tandem and multijunction solar cells (a-Si:H/a-Si:H tandems, triple ...

This study aims to provide a comprehensive review of silicon thin-film solar cells, beginning with their inception and progressing up to the most cutting-edge module made in a laboratory setting. There is a review of the ...

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