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Thin-film solar and power generation glass





Overview

What is thin film photovoltaic (PV)?

Thin film photovoltaic (PV) technologies often utilize monolithic integration to combine cells into modules. This is an approach whereby thin, electronically-active layers are deposited onto inexpensive sub-strates (e.g. glass) and then interconnected cells are formed by subsequent back contact processes and scribing.

What are the different types of thin-film photovoltaic solar cells?

The main technologies representing the thin-film photovoltaic solar cells include: 1. Cadmium telluride (CdTe) cells. 2. Copper indium gallium selenide (CIGS) cells. 3. Amorphous silicon (a-Si) cells. 4. Gallium arsenide (GaAs) cells. The history of CdTe solar cells dates back to the 1950s.

What is a thin-film solar cell?

The film thickness of a thin-film solar cell differs from a few nanometers (nm) to tens of micrometers (μm), that is much thinner than a commercial silicon wafer ($\sim 200 \mu\text{m}$), which are the base for fabricating conventional silicon solar cells. Thin-film cells are thus thinner, lighter, and have less drag to counter breakage rates.

How are amorphous thin film Solar Cells fabricated?

5.1. Amorphous Thin-Film Silicon (a-Si) a-Si solar cells, typically $1\text{-}\mu\text{m}$ thick, are fabricated using a layered method starting with a silicon dioxide substrate and p-type tin oxide (SnO_2) contact. a-Si is deposited by decomposing silane gas (SiH_4), creating dangling bonds passivated by hydrogen .



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Cadmium Telluride (CdTe) Solar CellsCopper Indium Gallium Selenide (CIGS) Solar CellsGallium Arsenide Thin-Film CellsAmorphous Silicon Solar CellsFor single-crystalline, costly, thin-film solar cells, an active layer consisting of gallium arsenide (GaAs) is employed, producing a competing semi-conducting material. GaAs cells are relatively expensive, yet they have the best single-junction solar cell efficiency in the world at 28.8%. This technology is frequently utilized in space crafts given See more on link.springer Author: Abdul Hai Alaminrel.gov[PDF]

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