

Structure diagram of polycrystalline silicon solar cell

What is the device structure of a silicon solar cell?

The device structure of a silicon solar cell is based on the concept of a p-n junction, for which dopant atoms such as phosphorus and boron are introduced into intrinsic silicon for preparing n- or p-type silicon, respectively. A simplified schematic cross-section of a commercial mono-crystalline silicon solar cell is shown in Fig. 2.

What is polycrystalline silicon?

Polycrystalline silicon, or multicrystalline silicon, also called polysilicon, poly-Si, or mc-Si, is a high purity, polycrystalline form of silicon, used as a raw material by the solar photovoltaic and electronics industry. Polysilicon is produced from metallurgical grade silicon by a chemical purification process, called the Siemens process.

Are polycrystalline silicon based solar cells reasonable?

Basic polycrystalline silicon based solar cells with a total area efficiency of app. 5% has been fabricated without the involvement of anti-reflecting coating. This is a reasonable result considering that commercial high efficiency solar cells have a conversion efficiency of about 22%, as outlined in chapter 1.

What are crystalline silicon solar cells?

During the past few decades, crystalline silicon solar cells are mainly applied on the utilization of solar energy in large scale, which are mainly classified into three types, i.e., mono-crystalline silicon, multi-crystalline silicon and thin film, respectively.

What is a crystalline solar cell?

The first generation of the solar cells, also called the crystalline silicon generation, reported by the International Renewable Energy Agency or IRENA has reached market maturity years ago. It consists of single-crystalline, also called mono, as well as multicrystalline, also called poly, silicon solar cells.

What is crystalline silicon?

In solar cell fabrication, crystalline silicon is either referred to as the multicrystalline silicon (multi-Si) or monocrystalline silicon (mono-Si) [70-72]. The multi-Si is further categorized as the polycrystalline silicon (poly-Si) or the semi-crystalline silicon, consisting of small and multiple crystallites.

The phenomenal growth of the silicon photovoltaic industry over the past decade is based on many years of technological development in silicon materials, crystal growth, solar cell device ...

The basic cell structure used in current industrial crystalline solar cells were developed for space and terrestrial use in the 1970s: a lightly doped n⁺ layer (0.2-0.3 mm) for ...

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Crystalline silicon (c-Si) solar cells have enjoyed longstanding dominance of photovoltaic (PV) solar energy, since megawatt-scale commercial production first began in the ...

The silicon structures were embedded in a stack of 300 ... Y. Qiu, I. Gordon, J.S. Im, J. Poortmans, Thin-film polycrystalline silicon solar cells with low intragrain defect density ...

Overview Vs monocrystalline silicon Components Deposition methods Upgraded metallurgical-grade silicon Potential applications Novel ideas Manufacturers Polycrystalline silicon, or multicrystalline silicon, also called polysilicon, poly-Si, or mc-Si, is a high purity, polycrystalline form of silicon, used as a raw material by the solar photovoltaic and electronics industry. Polysilicon is produced from metallurgical grade silicon by a chemical purification process, called the Siemens process. This process involves distillation of volatil...

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This work optimizes the design of single- and double-junction crystalline silicon-based solar cells for more than 15,000 terrestrial locations. The sheer breadth of the simulation, coupled with the vast dataset it generated, makes it possible to ...

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