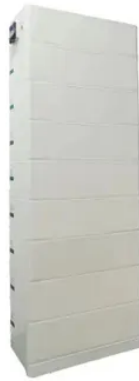


Crystalline Solar Cell Manufacturing



Overview

Reliability, performance and cost are the key parameters for all PV products. The technology dominating the PV market until today with a market share of ~80% is the very robust and versatile double-side contacted silicon solar-cell. During previous years the development and manufacturing of this standard cell architecture has been very successful with respect to the continuous reduction of unit-cost and improvement in efficiency, maintaining its dominance i. Reliability, performance and cost are the key parameters for all PV products. The technology dominating the PV market until today with a market share of ~80% is the very robust and versatile double-side contacted silicon solar-cell. During previous years the development and manufacturing of this standard cell architecture has been very successful with respect to the continuous reduction of unit-cost and improvement in efficiency, maintaining its dominance in the PV arena despite a huge number of competing thick- and thin-film concepts and technologies. In this paper we present an overview about the ongoing development and manufacturing activities at Q-Cells, which show, that also for the next years to come, the continuous improvement of the standard cell architecture still has an enormous potential with respect to cost and efficiency and hence to €/Wp and finally €/kWh reduction. The main levers are the optimization of optical and electrical front side properties and the successful transfer of low cost backside passivation and metallization concepts from the R&D lab into pilot- and finally high volume production. We applied these well known concepts to our 6" p-type standard mono and multi-crystalline wafers including umg-Si. The results, achieved in our R&D Pilot Production facility at Thalheim, show stable median efficiencies exceeding 19% for our mono- and 18% for our multi-crystalline solar cells including umg-Si. These cells feature a lowly doped emitter, a fineline-printed Ag grid and a dielectric passivated rear. crystalline siliconBSFdielectric passivated rearsideDPRmonopolyumgmanufacturingrecord efficienciesEnergy Procedia 6 (2011...

Article Content

Crystalline Silicon Photovoltaics Research

Below is a summary of how a silicon solar module is made, recent advances in cell design, and the associated benefits. Learn how solar PV works. What is a Crystalline Silicon Solar Module? A solar module—what you have probably ...

Advanced manufacturing concepts for crystalline silicon solar cells ...

An overview is given concerning current industrial technologies, near future improvements and medium term developments in the field of industrially implementable crystalline silicon solar cell ...

5 Steps For Monocrystalline Silicon Solar Cell Production

Crystal growth technology is a principal step of the monocrystalline-silicon solar cells production, which transforms high-purity silicon into a single, continuous monocrystalline structure. The ...

Progress in crystalline silicon heterojunction solar cells

Recently, the successful development of silicon heterojunction technology has significantly increased the power conversion efficiency (PCE) of crystalline silicon solar cells to 27.30%. This review firstly summarizes the ...

Crystalline Silicon Solar Cells

Presents a practical approach to solar cell fabrication, and characterization; Offers modular methodology with detailed equipment and process parameters supported by experimental results; Includes processing diagrams and tables for 16% ...

Silicon Solar Cell Fabrication Technology

In this chapter, we cover the main aspects of the fabrication of silicon solar cells. We start by describing the steps to get from silicon oxide to a high-purity crystalline silicon ...

Advances in crystalline silicon solar cell technology for industrial ...

Crystalline silicon PV cells are the most popular solar cells on the market and also provide the highest energy conversion efficiencies of all commercial solar cells and...

Silicon Solar Cells: Materials, Devices, and Manufacturing

More than 80% of manufactured solar cells are based on a crystalline silicon (single-crystalline or multicrystalline) substrate. The value stream of the photovoltaic industry is shown in Fig. 51.2 [...

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For more information, pricing, or custom solutions, please contact us:

Website: <https://www.paradoxsolar.co.za>

Email: sales@paradoxsolar.co.za

Phone: +33 7 48 29 63 15

Address: 15 Quai Jean Moulin, 69002 Lyon, France

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