

What is a black silicon solar cell?

Black silicon is layered on the front surface, usually with another passivation layer. In a recent study by Savin et al. [ 6 ], they have reported a record-breaking b-Si solar cell efficiency of 22.1% using an IBC configuration. Fig. 12 (b) shows the configuration of the solar cell used in their study.

What is the power conversion efficiency of black silicon back-contacted solar cells?

A power conversion efficiency of 22% is achieved in black silicon back-contacted solar cells through passivation of the nanostructured surface by a conformal alumina layer.

What is black silicon (B-Si)?

One notable direction in the photovoltaics technology is the usage of black silicon (b-Si) for solar cells. Black-Si has textured surface, which can assist light trapping and improves efficiency of solar cells. Black-Si was first fabricated by Jansen et al. [3] in 1995, and it exhibits a characteristic black surface colour.

Are black-Si solar cells better than Si solar cells?

Black-Si-based solar cells are capable of achieving a similar or even higher efficiency than industry-standard Si solar cells at a lower production cost [5 ]. As of January 2018, b-Si dominates about 30% of the multicrystalline Si solar cell market and holds a market value of \$16 billion a year [9 ].

Does a B-Si solar cell perform better than an acid-textured solar cell?

The b-Si surface was fabricated using PIII. In their study, the b-Si solar cell performed worse than the polished, acid-textured cell, while removing the surface defects improved the cell performance better than the acid-textured cell. Similar results have also been achieved by Su et al. [114] on b-Si solar cells fabricated using MACE.

Will B-Si take over the multicrystalline silicon solar cell market?

As of January 2018, b-Si dominates about 30% of the multicrystalline Si solar cell market and holds a market value of \$16 billion a year [9 ]. It was also reported that analysts have predicted that b-Si will take over 100% of the multicrystalline silicon solar cell market by the year 2020 [9 ].

Black silicon (BSi) represents a very active research area in renewable energy materials. The rise of BSi as a focus of study for its fundamental properties and potentially lucrative practical applications is shown by several recent results ...

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