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Next – generation interdigitated back-contacted silicon heterojunction solar cells and modules by design and process innovations

NEXTBASE
THE NEXT GENERATION BASELINE

NextBase - Deliverable report

D7.1- Demonstration of the new interconnection technologies in working mini-modules of 2X2 cells

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Publishable summary

Module technology partners in the NextBase project aim to demonstrate that efficient interconnection technology for back contact cells does not need to rhyme with high cost or complexity. CSEM and imec jointly with Meyer-Burger are investigating multi-wire interconnection technologies for back contact cells. Using this concept for contacting interdigitated back contact (IBC) cells has significant advantages, notably the reduction of power losses in the cell finger and the huge potential cost decrease owing to reduced material usage for cell metallization. To contact standard silicon heterojunction (SHJ) solar cells, the SmartWire Connection Technology (SWCT) is the only mature and industrial technology from the multi-wire interconnection approaches, with recent demonstration of record module performance (up to 335 W for a 60 cells module as demonstrated by Meyer Burger in November 2017).

However, the transfer of the concept from standard cells to back contact cells is not a simple task. The interconnection of back contact cells is inherently more complex than two-side contacted cells as both cell polarities are on the same side, while still the opposite cell and metallization polarities must be isolated.

After a first year of intense development, CSEM reports the first minimodule with IBC-SHJ cells and SWCT interconnection, showing an impressive bifaciality of more than 77% in agreement with calculated optical losses. The cell to module power ratio is close to 98%. Implementation of the multi-wire approach was further conducted on modules of 2x2 cells using samples with metallization structures. Through demonstration that there is no shunting between the two polarities we could validate the proposed innovative approach. Further developments will focus on assessing and achieving high reliability. Research on imec's innovative cell interconnection technology where encapsulant, isolation and interconnection are combined in one woven layer has been started.

The first mini-module demonstration of multi-wire interconnection leveraging highly innovative concepts is a major milestone for the project. Based on the performance and properties of the selected materials, the partners are confident that the interconnection technologies can meet the combined performance, reliability and cost targets of the NextBase project. They are jointly aiming at the demonstration on 60-cell bifacial modules at the end of the project.

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