Light Management for Industrial two terminal perovskite silicon tandem PV modules

Publieke samenvatting / Public summary

Aanleiding

State-of-the-art 2 terminal (2T) perovskite/crystalline silicon (c-Si) tandem cells have reached efficiencies over 29% with planar front sides. However, an estimated 3% absolute efficiency can be lost due to reflections in tandem cells with planar front, and industrially relevant light management solutions for tandem modules are required for achieving impact.

Doelstelling

The goal of the project is to investigate two solutions for light management of 2T perovskite/c-Si tandem cells that are expected to boost efficiency by 4% absolute. This contributes to the efficiency and cost reduction goals of the MMIP2, and benefits implementation of PV in the built environment.

Korte omschrijving

The activities are divided into four parts: - PERC c-Si bottom cells with both planar and textured front sides will be prepared by HQC, TNO, and Tempress. A texture with submicron pyramids will be developed and optimized for the first light management solution. - New perovskite formulation and slot-die coating processes will be developed by TNO for compatibility of solution-processed perovskite with the c-Si surface texture. Small spin-coated perovskite top cells will be improved by TUe and the knowledge for optimization transferred to TNO's industrially relevant slot-die coated devices. - A texture layer on module glass as the second light management solution will be optimized by

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Algemene informatie / General information

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Publicaties en materialen / Publications and attachments

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Morphotonics for reduced material consumption and stability against UV and soiling. The tandem cells will be encapsulated for characterization and outdoor tests by TNO. - techno-economic analysis will be done for the two light management solutions.

Resultaat

The project will deliver perovskite/PERC tandem cells and modules, with the above two approaches for light management. The target efficiency is 4% absolute improvement over the state-of-the-art PERC, i.e. about 27%. Comprehensive comparison of two light management solutions will conclude on the outlook and further development towards industrialization.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.
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