Bifacial Passivated Emitter Rear Front Contact solar cells

Publieke samenvatting / Public summary

Aanleiding

Excellent surface passivation and carrier selectivity of passivating contacts based on poly-Si and its alloys with oxygen or carbon result in c-Si solar cells with high open-circuit voltages, fill factors and efficiency. Main challenges of deploying these contacts are minimizing their parasitic optical absorption and optimizing metallization steps.

Doelstelling

Research on the poly-Si-alloy passivating contacts for large-area wafers. Focus is on their contact characteristics when combined with transparent conductive oxides (TCO) and metallization. 6-inch high-efficiency c-Si solar cells with a novel architecture will be demonstrated using a simple flow chart.

Korte omschrijving

The ultra-thin poly-Si and poly-SiOx passivating contacts developed within the RADAR and HT-SOHO TKI projects will be optimized for PECVD and LPCVD equipment with high-throughput deposition on 6-inch wafers. Contact properties of ultra-thin poly-Si alloys combined with different TCO materials, including sputtered- and ALD-deposited ITO, IFO, and ZnO, and the influence of post annealing treatments will be studied and evaluated. Different patterning approaches for the process of poly-Si fingers and the surrounding diffused c-Si surface will be experimentally studied, including masking and etching-back, deposition through hard mask, phosphorous and boron dopants diffusion. Effect of

Projectinformatie / Project information

Projectnummer / Project number
TKITOE1921201
Subsidiebedrag / Grant amount
€ 267.455,00

Algemene informatie / General information

Penvoerder / Secretariat
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screen-printing and sputtering of silver and double-sided copper plating of metal electrodes on solar cell performance will be investigated. Optimized processes will be integrated into the flowchart for 6-inch mono-facial and bi-facial solar cells fabrication.

Resultaat

This project will address and solve key bottlenecks for applying poly-Si-alloy passivating contacts for high efficiency 6-inch c-Si solar cells. A 6-inch mono-facial solar cell with >22% efficiency and a highly efficient lab-scale bi-facial solar cell based on processes ready for up-scaling to 6-inch will be delivered.

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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