Advanced Boron Emitters and industrial Contact technology for c-Si solar cells

Publieke samenvatting / Public summary

Aanleiding

Because of the rapid recent improvement of n-type solar cells thanks to the application of polysilicon based contacts at the rear, the front of the solar cell, having usually (particularly in industry) a uniform diffused boron emitter, has become limiting and needs to be improved more urgently than ever.

Doelstelling

The objective of this project is to develop a novel diffused boron emitter process, and implement a selective emitter that is easy to manufacture. An efficiency improvement of 1%abs is targeted, resulting in 23.0% efficiency at project end, with a low complexity process suitable to realize a cost reduction at module level.

Korte omschrijving

The project will focus on boron emitter diffusion, dielectric-layer surface passivation, and contacting technology for a diffused selective emitter with very low recombination. Tube furnace emitter diffusion processes will be developed to obtain optimized dopant profiles with reduced Auger and minimized surface recombination. Methods to combine such profiles with locally heavier doping under contacts will be developed. Adjustment of the dielectric surface passivation is likely necessary due to the low surface doping of the emitter. The new emitters will be applied in ECN's state-of-the-art process flows for cells with polysilicon back contact. Metal contacts, by application of industry-typical fire-through as well as recently introduced non-fire-

Projectinformatie / Project information

Projectnummer / Project number
TKITOE1621101
Subsidiebedrag / Grant amount
€ 360.660,00

Algemene informatie / General information

Publicaties en materialen / Publications and attachments

- **14.04.2020**

  Eindrapport BEACON 2019 (TKITOE1621101)

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through metal pastes, and its contacting mechanisms will be investigated and optimized to reduced area as well as specific contact recombination, while maintaining or improving contact resistance. Extensive characterization and modeling of the emitter and the metal-silicon interface structures will be emphasized.

Resultaat

The project will result in novel technology for boron diffusion, emitter passivation, and low-cost metallization processes for n-PERT cells with passivating contacts at the rear enabling 23% cell efficiencies and understanding of the working principles behind the technology. Such results will be unique for 6 inch, industrial, front-and-back contacted cells. Development will be aimed at, and evaluated for, industrial application.

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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