

Pamplona: P-type cells And Modules Processed using a LOw-cost and Novel Approach

Publieke samenvatting / Public summary

Aanleiding

Solar PV modules have significantly dropped in price in recent years. This price reduction is mainly due to economies of scale. Further price reduction requires higher efficiencies, thinner Si wafers and faster processes with high yield for both the cell and the module and material reduction (metal on cell, encapsulation and interconnection materials in module). To achieve this, new concepts and processes to manufacture the cells and modules are needed, as with present day processes further optimisation is limited. The current state of the art PV module consists of solar cells with Ag metallisation on the front and Al all over the rear side. The cells are interconnected using Cu tabs soldered to the cells. With this cell and module design, further cost reduction is barely possible: Al and Ag consumption on the cell cannot be reduced, thinner wafers are not compatible with the manufacturing processes and process speed and yield are limited. This project will tackle these issues by outlining new concepts and processes.

Doelstelling

The aim is to manufacture solar cells on Cz wafers and multi-crystalline wafers with efficiencies of 20% and 18.5% respectively, with a wafer thickness of 120 micrometer (33% less than current wafer thickness). Losses from cell-to-module will be reduced to zero (currently 5%). The overall cost reduction at module level will be 20% compared to current state of the art.

Projectinformatie / Project information

Projectnummer / Project number
TEZ0113001

Subsidiebedrag / Grant amount
€ 812.966,00

Algemene informatie / General information

Penvoerder / Secretariat
Eurotron B.V.

Publicaties en materialen / Publications and attachments

- 09.11.2017

**Eindrapport Pamplona 2016
(TEZ0113001)**

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Korte omschrijving

This project focuses on new cell- and module concepts with the application of new materials, as well as the development of the accompanying processes. Instead of using Ag and full size Al, new metallisation processes in combination with an Al₂O₃ layer at the rear and improved front side diffusion/passivation will be applied. This will be done by combining the expertise of Tempres (diffusion processes), Mecos (metal plating technology), Levitech (Al₂O₃ layer deposition) and ECN (solar cell design and processing) to integrate all processes into improved solar cell concepts with high efficiency. The optical and electrical losses from cell to module will be minimised, by designing the module for optimum optical matching and using low temperature interconnection processes with low losses. The module manufacturing processes will also be suitable for thin wafers of 120 micrometer. This will be achieved by combining the expertise of Eurotron (module manufacturing equipment and process) and ECN (module design and testing).

Resultaat

By combining the expertise of this consortium, this project will result in solar modules based on Cz wafers with 20% efficiency and solar modules based on mc wafers with 18.5% efficiency. Furthermore a cost reduction of 20% compared to the current state of the art will be achieved.

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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