Cost-effective cell Optimization for Reliability

Publieke samenvatting / Public summary

Aanleiding

Surfaces with excellent passivation are core enablers for high-efficiency cells. For market introduction of such technology, including next-generation solar cells, module reliability is key. However, reliability is currently hampered by potential-induced degradation (PID), leading to severe losses. We propose a solution for PID-free cells through the cell's surface modification.

Doelstelling

The goal of this project is to understand the PID-polarization mechanisms, and to develop a cost-effective solution for the cell's surface passivation layer. The solution will be applicable to fabricate PID-stable new cell concepts. As case studies we investigate cells with advanced surface passivation layers, such as applied in PERPoly or poly-IBC cells.

Korte omschrijving

For n-PERT cells, a solution for PID-stability was found in modification of the surface passivation layer. We will investigate this route now for new cell concepts, in which the doped surfaces become more lightly doped (to get on track with the excellent passivation of the recently introduced polysilicon passivating contacts) and thus potentially more PID-sensitive. With an adjusted test set-up, we will monitor relevant parameters during the PID testing, such as dark IV and/or leakage current. Surface conditions of the cell will be varied, such as the amount and polarity of the surface doping, as well as the passivation layer parameters, such as fixed charges and conductivity. We will evaluate the impact of the surface and passivation layer

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parameters on PID stability. With these results, we will improve the PID model and understanding. In the next step we will implement the new understanding by engineering the surface passivation for each surface to improve the PID stability.

Resultaat

The more fundamental understanding of PID-p will result in the development of solar cells with passivation layers that are intrinsically PID resistant. This will improve module reliability, which is indispensable for a low LCOE, both for the current and new cell concepts.

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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