ALD4PSC

Publieke samenvatting / Public summary

Aanleiding

The very exciting and intensive research in the field of perovskite solar cells (PSC) is motivated by the excellent opto-electronic properties of the absorber and its long carrier diffusion lengths. In just a few years, the PSC conversion efficiency has reached 22%. Despite the outstanding progress, several challenges have to be addressed in order to develop a perovskite-based mature PV technology ready for commercialisation. A major challenge is the poor PSC device environmental stability.

Doelstelling

ALD4PSC aims to pave the way for atomic layer deposition (ALD) to deliver high quality metal oxides serving as charge transport layers, while also improving the environmental stability of the PSC device. Fundamental understanding of the metal oxide/perovskite interface will be key to efficient and selective charge transport. The achieved results will be of great relevance to PSC industrial residents at Solliance and to Dutch ALD equipment manufacturers.

Korte omschrijving

TU/e will synthesize metal oxide layers by atomic layer deposition, in line with a first selection based on band energy alignment between the metal oxide serving as charge transport layer and the perovskite absorber. The metal oxide processing will also include the exploration of novel ALD routes to make the processing of thin metal oxide layers compatible with direct deposition on the perovskite absorber. TU/e and ECN will couple the fundamental understanding of the charge transport

Projectinformatie / Project information

Projectnummer / Project number
TKITOE1409105
Subsidiebedrag / Grant amount
€ 95.000,00

Algemene informatie / General information

Penvoerder / Secretariat
TU Eindhoven

Publicaties en materialen / Publications and attachments

- **18.11.2019**

  Eindrapport ALD4PSC 2019 (TKITOE1409105)

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layer/perovskite interface with the engineering/characterization of PSC devices, where metal oxide thin films are adopted as charge transport layers. GreatSolar, as industrial resident at Solliance, will contribute to the project by sharing its knowledge on PSC stacks and supporting the selection of the perovskite absorber, transport layers and contacts. Also, GreatSolar will assist ECN in solar cell engineering and characterization. Finally, TNO and TU/e will transfer the ALD processes developed on the lab-scale setup to TNO's fast, large area processing spatial ALD system. In parallel, MBNL will contribute to the project by addressing the scalability of the spatial ALD process.

Resultaat

The ALD4PSC project will lead to a clear and convincing demonstration of the benefits of metal oxide layers in perovskite solar cell structures, namely selective and efficient charge transport layers, accompanied by an improvement in PSC environmental stability. Next to the scientific insights in the charge transport layer/perovskite interface, the project's results will be of great relevance to PSC industrial residents at Solliance and Dutch ALD equipment manufacturers.

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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