HORIZON-CL5-2023-D3-02-12
Large area perovskite solar cells and modules

LUMINOSITY

Large area uniform industry compatible perovskite solar cell technology

Starting date of the project: 01/06/2024
Duration: 48 months

= Deliverable D3.2 =

Specifications for transport layers for upscaled processing

Abstract

Deliverable D3.2 presents the preliminary specifications for transport layers for upscaled perovskite solar cell processing within LUMINOSITY. The work addresses the selection and development of hole and electron transport layers, protective buffer layers and transparent conductive oxides, considering their suitability for future industrial upscaling.

NiOx was selected as a promising hole transport layer, while wet processing and alternative materials are being considered due to considerations related to its use in scaled processing. PCBM was selected as the electron transport layer, including the investigation of thicker PCBM layers for additional diffusion-blocking functionality.

A solution-processed protective buffer layer was developed to protect the perovskite stack during deposition of the ITO transparent contact. The selected metal oxides nanoparticle layer enabled an efficiency of 18.1%, comparable to the opaque reference cells with Cu contacts. In parallel, initial indium-free transparent conductive oxides and FTO/SnO bilayers were developed, showing promising optical and electrical properties for their use as front window layers in solar cells.

Overall, the results establish preliminary material and processing specifications to guide the further development and upscaling of transport layers within LUMINOSITY.

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