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 D2.1 =

Gen01 cells

Abstract

Work Package 2 (Absorber Development) of the LUMINOSITY project focuses on the development of small-scale perovskite solar cells, including optimisation of the perovskite bandgap and process conditions for scalable fabrication, with particular attention to slot-die coating. The work aims to demonstrate high-efficiency flexible perovskite solar cells, targeting a power conversion efficiency (PCE) above 21% at small scale (<1 cm^2), while establishing a pathway towards scalable processing.

The results demonstrate the progress of the consortium partners in developing devices using scalable processing techniques. High-performance cells were demonstrated on rigid and flexible substrates, including 24.9% PCE on rigid glass, 19.5% on flexible PEN/ITO, and 15.6% on Al-based substrates. QFLS measurements further indicated the potential to reach 22.1% PCE using a 1.53 eV perovskite bandgap.

The work also identified key challenges associated with flexible Al/FTO substrates, particularly substrate quality and surface roughness, which affect perovskite film quality and device performance. The consortium has established mitigation strategies and initial improvements to address these limitations. The findings provide a basis for further optimisation of flexible perovskite solar cells and for transferring the knowledge gained at small-area, sheet-to-sheet scale towards large-area roll-to-roll processing within LUMINOSITY.

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