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 D6.2 =

Stable Gen01 module

Abstract

Deliverable D6.2 presents the indoor and outdoor stability assessment of laminated flexible perovskite cells and Gen-01 modules within LUMINOSITY. The work combines accelerated indoor testing, including damp-heat and thermal cycling, with outdoor monitoring under real operating conditions. Advanced characterisation techniques were also applied to investigate degradation pathways at material, interface and device levels.

Indoor testing of flexible devices with different hole transport layers showed that PTAA-based devices provided the best stability under damp-heat and thermal cycling conditions compared with SAM- and NiOx-based configurations. This trend was also observed in outdoor testing at the HZB and CUT test sites.

For the Gen-01 modules, initial outdoor monitoring at HZB showed nearly constant performance during the first two weeks of exposure. Tests at CUT highlighted the influence of electrode configuration on outdoor durability, while indoor ageing identified early-stage degradation primarily through losses in fill factor.

Outdoor soiling studies further showed greater optical-transmittance losses for polymer front sheets compared with reference glass. Overall, the findings identify key material, interface, electrode and encapsulation factors affecting the stability of flexible perovskite devices and provide input for further optimisation of future module generations.

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