EUROPEAN COMMISSION

HORIZON 2020 PROGRAMME
TOPIC H2020-LC-SC3-2019-RES-IA-CSA
Increase the competitiveness of the EU PV manufacturing industry

GA No. 857793

High-performance low-cost modules with excellent environmental profiles for a competitive EU PV manufacturing industry

HighLite- Deliverable report

D3.7- Implementation of an integrated bypass-diode in IBC cell.

Disclaimer/ Acknowledgment

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857793. The information and views set out in this publication does not necessarily reflect the official opinion of the European Commission. Neither the European Union institutions and bodies nor any person acting on their behalf, may be held responsible for the use which may be made of the information contained therein.

About HighLite

The HighLite project aims to substantially improve the competitiveness of the EU PV manufacturing industry by developing knowledge-based manufacturing solutions for high-performance low-cost modules with excellent environmental profiles (low CO_2 footprint, enhanced durability, improved recyclability). In HighLite, a unique consortium of experienced industrial actors and leading institutes will work collectively to develop, optimize, and bring to high technology readiness levels (TRL 6-7) innovative solutions at both cell and module levels.

HighLite consortium members

Document information

Deliverable No.	HighLite D3.7
Related WP	WP3
Deliverable Title	Implementation of an integrated bypass-diode in IBC cell
Deliverable Date	30 – 09 – 2021
Deliverable Type[i]	Report
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Document history

Date	Revision	Prepared by	Approved by	Description
23/09/2021	1	Task Leader	WP leader	First draft
29/09/2021	2	WP Leader	Coordinator	Final

Dissemination level[ii]

PU	**Public**	
CO	**Confidential, only for members of the consortium (including the Commission Services)**	X

Publishable summary

Cell-integrated bypass diodes ensure homogeneous heat dissipation in reverse bias and improved cell performance at lower than standard illumination levels, conditions which are more likely to occur on “randomly-oriented” and partially shaded BIPV and VIPV modules. Two methods have been explored to demonstrate the feasibility of making IBC cells with an integrated bypass diode by evaluating the effect on reverse bias behaviour and cell performance. One method tries to form a bypass-diode with phosphorous-doped polycrystalline silicon and aluminium-doped silicon. The other method tries to form a bypass-diode with a phosphorous-doped silicon and a boron-doped polycrystalline silicon. Both methods show a high negative current in reverse bias in the first experiments. While the first approach has a negative impact on cell performance in forward bias, the second approach shows good results in forward bias and proves the fundamental functionality of the cell-integrated bypass diode.