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Increase the competitiveness of the EU PV manufacturing industry

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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.

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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 CO₂ 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

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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.