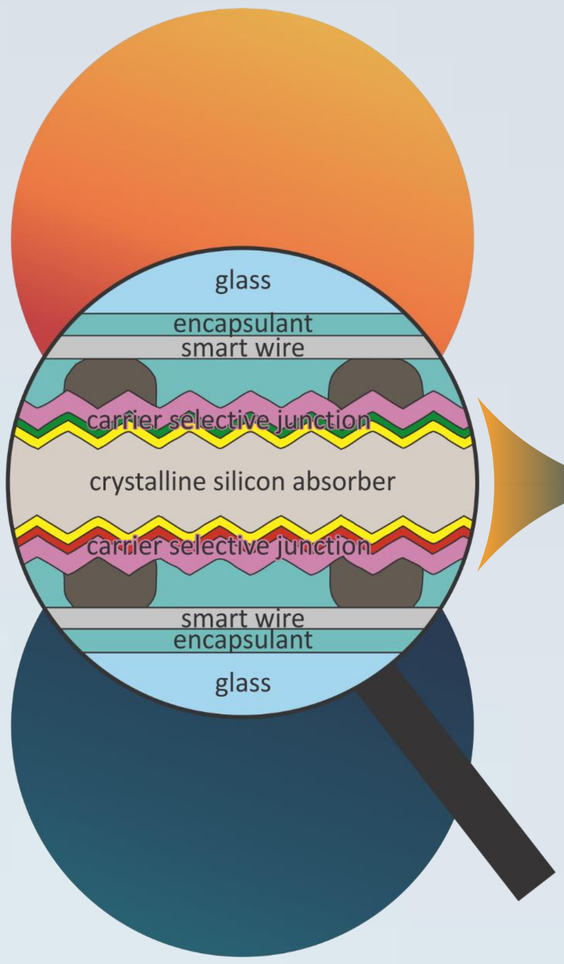
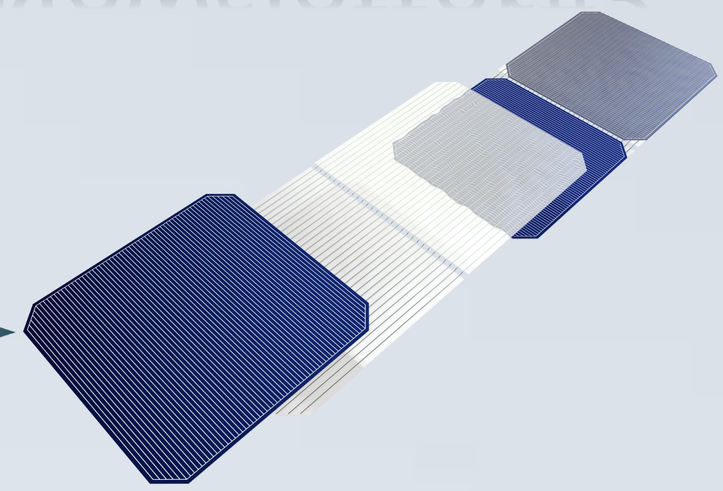
DISC

Newsletter#3

Double Side Contacted Cells

with innovative carrier selective contacts





General description

The DISC project addresses the need to reduce the consumption of fossil fuels by developing key technologies for the next generation of high performance photovoltaic (PV) solar cells and modules, allowing ultra-low solar electricity costs with minimum environmental impact.

Focus & targets

Technological

- Double-side contacted Silicon solar cells with carrier selective junctions and optimized metallization and TCO.
- Efficiencies > 25.5% on large area cells (>100 cm^2) and >22% at module level with area < 1.65 m^2.

Economical

- Lower levelized costs of electricity between 0.04 – 0.07 €/kWh.
- Reduce fabrication complexity and production line investment: 0.04 €/W_p of production cost on module level and a mid-term potential of 0.33 – 0.35 €/W_p

Sustainability

- Increased efficiency, reliability and durability.
- Reduced non-abundant material consumption (Silver, Indium)

Main project results

Carrier selective junctions

- Demonstration of 22.8% cell efficiency on 4 cm^2 cell with passivating contacts on both-sides where a single thermal treatment was used to cure the sputter damage and to hydrogenate from an SiNx ARC through the TCO

Transparent conductive oxides

- Improved understanding of the interplay between CSJ and TCO achieved by 3 different round-robins between partners (in total 7 CSJ layers combined with 6 different TCO layers)

Metallization and interconnection

- Metallization approaches for carrier selective contacts featuring TCOs were pushed to their limits, yielding >82% actual FF on best cells with the potential to go beyond 84% FF (<0.2 mOhmcm² contact resistivity, line width <30 µm, line conductance close to 1.7x10^-8)
- Innovative module concepts for CSJ junction solar cells (and beyond) were simplified and validated

Economical assessment, LCA and social acceptance

- DISC cells passed the stability tests and reached targets set forth for economical, environmental and social acceptance

Modelling and characterization

- Establishment of a dataset with electrical and optical parameters of different CSJs and TCOs
- Development of novel simulation models for improving the transport mechanism of CSJs
- Development of new contacting unit for LOANA systems that enables advanced characterization of busbarless solar cells including verification by round-robin measurements.

Communication, dissemination and exploitation

- 14 articles in peer-review journals (@IEEE JPV, Sol-Mat, Solar RRL, JAP, ACS E Letters)
- 61 conference contributions (1 plenary, 33 oral, 27 visual @ EU PVSECs, IEEE PVSCs, Silicon PVs etc.)
- *H2020 Projects for the Future of PV in EU* Booth @ EU PVSEC 2019
- *High Efficiency Approaches in c-Si PV Workshop*

organized with NextBase and Ampere

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