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SPHINX - Deliverable report

D3.8 – Encapsulants for functional and aesthetic PV

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Public Summary

The SPHINX project developed two key solutions to improve solar module efficiency. The first involves UV selective absorbing elements that convert high-energy photons into lower-energy ones, boosting efficiency and protecting TOPCon cells from UV-induced degradation. The UV downshifting encapsulant absorbs UV photons and emits less-damaging blue light.

The second solution focuses on increasing light capture by reflecting IR light back into the solar cell. This involves a colored rear encapsulant with IR reflective components, expected to provide a bifacial power boost and lower the temperature behind the panel. The encapsulants were tested for performance and reliability, showing promising gains in short-circuit current density and efficiency, especially under varying weather conditions. However, the IR-reflective back encapsulants showed less promising results compared to the UV-downshifting front encapsulants.

Overall, the SPHINX project demonstrated potential improvements in solar cell performance through innovative encapsulant materials, with detailed studies on their fabrication, upscaling, and reliability under different climatic conditions.

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Project partners:

#	Partner short name	Partner Full Name
1	VOL	VOLTEC SOLAR
2	ETW	ETWAY S.R.L.
3	HLP	HELIUP
4	M10	M10 INDUSTRIES AG
5	UNR	UNIRESEARCH BV
6	Fraunhofer	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV
7	ICARES	ICARES CONSULTING
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8	CEA	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
9	FSUNS	Freesuns SA
10	CSEM	CSEM CENTRE SUISSE D'ELECTRONIQUE ET DE MICROTECHNIQUE SA - RECHERCHE ET DEVELOPPEMENT
11	EPFL	ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE
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