Expected Results

- High-quality perovskite absorbers in 3 bandgap ranges stable towards light, heat and humidity
- Sustainable, scalables, low-cost perovskite deposition process.
- Indium-free TCO's.
- Encapsulation materials that ensure zero lead leaching during 25 years.
- In depth knowledge on degradation mechanisms of PSCs.
- Rigid, flexible and semi-transparent cells and modules, best cell PCE > 26%, best module PCE > 23% and outdoor stability > 25 years.
- Industrial accelerated stress test tool for perovskite PV.
- Proofing circularity by recycling of perovskites PV modules (100% Pb and Sn recovery/re-use).

Consortium

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Funded by the European Union

VALHALLA

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Grant Agreement n°101082176

About VALHALLA

January 2023 marked the beginning of the VALHALLA project that will run for three years with participants from eight European countries, funded by the European Commission through HORIZON EUROPE Research and Innovation Actions.

The VALHALLA project focuses on bringing **stable, solvent-free, perovskite solar modules** for clean electricity generation in Europe closer to market, working to provide pathways to a European industrial base.

VALHALLA will develop perovskite solar cells and modules with power conversion **efficiencies above 26 %** (modules > 23 %) and extrapolated operational lifetime > 25 years, following an **eco-design** approach: employing harmful-solvent-free perovskite deposition, optimized use of materials, circularity, recyclability, scalable and low-cost manufacturing processes, to create a viable economic pathway for the European commercialization of this sustainable technology.

The concept of VALHALLA is to bring together the critical expertise spanning all the technological competencies in order to redesign and realise a highly efficient, stable, scalable and cost-effective perovskite PV technology, with sustainability considerations driving all technical advancements.

Expected Impact

Scientific impact

- Increase the efficiency and stability and minimise the environmental impact of Perovskite PV.

Societal impact

- **Path 1:** Accelerate the replacement of fossil-based energy by making disruptive renewable energy available in 2050.
- **Path 2:** Minimise the impact of PV on landscape and environment.
- **Path 3:** Additional societal benefits.

Economic impacts

- **Path 4:** Increase the potential for commercialisation of perovskite PV, creating a competitive technological know-how for the European PV industrial base.
- **Path 5:** Creating a viable economic pathway for the commercialisation of the technology.
- Creating more and better jobs

Objectives

1. Stable absorbers with 3 bandgap ranges for varied PV applications
2. A fast harmful-solvent-free, sustainable and scalable low-cost perovskite deposition method
3. Rigid, flexible and semi-transparent stable cells > 26% efficiency and modules > 23% performance
4. Outdoor durability & reliability testing
5. Integrated eco-design, lead circularity & low-impact manufacturing