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Project details

Grant Agreement Number: 101091534

Project Full Title: Knowledge-driven fine-tuning of perovskite-based electrode materials for reversible Chemicals-to-Power devices

Project Acronym: KNOWSKITE-X

Topic: HORIZON-CL4-2022-RESILIENCE-01-19

Type of action: HORIZON-RIA

Granting authority: HADEA

Start date: 01 January 2023

Duration: 48 months

EU Contribution: 5.168.000.00 Euro

Contacts

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Project

The project will demonstrate a science-based approach to the development of **electrode materials** forming key parts of reversible **chemical-to-power cells**. Such devices operate in two modes: in fuel cell (FC) mode, it converts hydrogen into electricity whereas when operating as electrolyser cell (EC), it uses excess electricity to form hydrogen from water electrolysis. This versatility enables the integration of intermittent renewable energy sources with the electrical grid by storing the excess energy as **carbon-free chemical fuel**. In particular, the project targets mixed oxides with **perovskite structure** with minimised critical content while keeping highest possible performances and targeting fair economic viability.



Objective

The main objective of the KNOWSKITE-X project is to boost the development of materials for energy applications by combining state-of-art approaches together with the empowerment of knowledge discovery allowed by **artificial intelligence (AI)**.

In particular, the project **integrates a smart combination of advanced technologies**, involving tailor-made materials preparation, harmonised and ground-breaking characterisation methods, multi-scale modelling and AI-enabled tools. This corpus of open-minded, innovative, reliable, and use-relevant methodologies targets the discovery of the scientific knowledge required to sustain the rational design of optimized candidate electrode materials.

Impacts



Develop an open repository for knowledge transfer, data sharing for integration between modelling and advanced materials characterisation

Enable a model-based innovation processes covering all stages from materials design to product development, including validation, characterisation and life cycle assessment



Increase the efficiency and effectiveness of materials and product development by reducing costs and time for product design

Improve handling of missing data by means of artificial intelligence/machine learning methods

