



Coordinator



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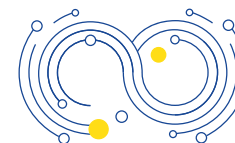
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MatCHMaker - HorizonEurope



MatCHMaker  
Materials Characterisation & Modelling

Open data and industry-driven environment  
for materials characterisation and modelling  
combining physics and data-based approaches



This project has received funding from  
the European Union's Horizon Europe  
research and innovation programme  
under grant agreement N° 101091687

MatCHMaker aims to reduce the time, cost and risks of developing and optimising advanced materials. This contributes to the **European Green Deal** to decarbonise the industry while enhancing people's quality of life.

## USE CASES



### Construction

#### Low carbon cement

#### Decrease CO2 emission in the production

Maximum substitution of clinker with alternative materials with equal/superior performance



### Energy

#### Solid Oxide Fuel/Electrolysis Cells (SOFC/SOEC)

Produce hydrogen without CO2 emissions and achieve the highest efficiency



### Mobility

#### Proton-Exchange Membrane Fuel Cells (PEMFC)

Produce zero-emission power in multiple applications in transportation



## OBJECTIVES



### Accelerate advanced materials development

Develop a model-based innovation process to accelerate the materials' design, validation, characterisation methods and computational modelling

### Traceability, Integrity and Interoperability

Enhance the interoperability and integration of characterisation and modelling data and workflows through a semantic approach



### Open Data Repository

Create an open data repository based on semantic representation to connect design and manufacturing processes



Advanced materials modelling and characterisation are crucial to designing and upscaling new materials which are more sustainable and resilient.

Requirements on multiphase and multiscale materials from the industrial sectors of **construction, energy and mobility** will be translated into specific innovation challenges.

In construction, **MatCHMaker** helps to build a predictive model for the strength of supplementary cementitious materials (SCM) as a function of the replacement level, clinker mineralogy and fineness.

In energy, **MatCHMaker** will focus on cell technology, aiming to improve performance and mechanical robustness of electrochemical cells implemented in SOEC/SOFC with advanced modelling and characterisation.

In mobility, **MatCHMaker** aims to develop new future high performance material by enhancing analytical and computational analysis. The hydrogen fuel cell system has the flexibility to be used in cars, and tests for its use in boats and trains are under way.



The MatCHMaker project aligns with the **UN Sustainable Development Goals**, especially with **SDG Nr.9 Industry, Innovation and Infrastructure** towards building a resilient infrastructure, inclusive and sustainable industrialisation and fostering innovation.