

Press Release

HyWay

Multiscale Characterisation and Simulation for Hydrogen Embrittlement Assessment: Development of an Open Knowledge Platform to Foster Capability Integration

The challenge:

The HyWay project aims to develop versatile, flexible and efficient multiscale material modelling and characterisation suites. These suites are specifically designed for assessing interactions between hydrogen and advanced metallic materials under service conditions of the hydrogen storage and transport infrastructure, and for demonstrating their capabilities on hydrogen storage and transport components. This is crucial for supporting the application of hydrogen technologies, which are necessitated for achieving the EU's carbon neutrality goal. Deploying hydrogen technologies needs a tremendous effort to complete the infrastructure, requiring efficient material assessment suites, enabling industries to be more effective in developing and working with materials. Furthermore, since hydrogen is stored and transported in several forms, the material assessment suites must be flexible and capable of revealing hydrogen-material interactions in various conditions.

The solution:

The HyWay suites contain 3 key modules:

- ➔ The physical realm that will advance experimental capabilities to reveal hydrogen-material interactions by compiling characterisation methodologies across length scale.
- ➔ The Virtual world will develop a multiscale and multiphysics materials modelling framework for disclosing how hydrogen changes the properties of advanced materials under various service conditions. The physical realm and the virtual world work in tandem and mutually complement each other through the data exchange between modules.
- ➔ The Data and Knowledge Management Platform , which will be established to facilitate the data exchange and merge material research disciplines.

HyWay will ensure the productive allocation of investments required in constructing the hydrogen infrastructure. It will strengthen European capability in guiding the green transition through the use of digital technologies and emerging enabling technologies, while also working to ensure an open strategic autonomy through its support for the transformation of the EU energy mix, focusing on hydrogen dominance.

The impact:

The HyWay project will impact the scientific community, particularly in research on advanced materials for hydrogen technologies, by enhancing the suites' capabilities to cover components' service conditions of the entire hydrogen value chain. HyWay will strengthen research, development and innovation initiatives between academia and industry, in order to design high-performance metals for hydrogen technologies in the long term. The HyWay suites will meet the high level of flexibility and improve the circular economy of the hydrogen value chain by accelerating the design and production of advanced metallic materials for hydrogen storage and transport components. Hence, the suites will contribute to society in the mid-term by improving the safety of hydrogen storage and transport components, avoiding an interrupted hydrogen supply. These benefits will help the EU increase hydrogen in the energy mix by ensuring sufficient supply and support carbon neutrality in the future.

The consortium:

The consortium comprises renowned experts from academia and industries across the EU and will support Ukraine on its European path.



No.	Partner	Short name	Country
1	TEKNOLOGIAN TUTKIMUSKESKUS VTT OY	VTT	Finland
2	AALTO KORKEAKOULUSAATIO SR	AALTO	Finland
3	NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU	NTNU	Norway
4	HELSINGIN YLIOPISTO	UH	Finland
5	MAX-PLANCK-INSTITUT FUR EISENFORSCHUNG GMBH	MPIE	Germany
6	RIGAS TEHNISKA UNIVERSITATE	RTU	Latvia
7	SIA DATI GROUP	DATI Group	Latvia
8	SIDENOR INVESTIGACION Y DESARROLLO SA	SIDENOR I+D SA	Spain
9	ONDERZOEKSCENTRUM VOOR AANWENDING VAN STAAL NV	OCAS	Belgium
10	ASSOCIATION POUR LA RECHERCHE ET LE DEVELOPPEMENT DES METHODES ET PROCESSUS INDUSTRIELS	ARMINES	France
11	ECOLE NATIONALE SUPERIEURE DES MINES DE PARIS	ENSMP	France
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16	RTD TALOS LIMITED	TALOS	Cyprus
17	NARDI COMPRESSORI SRL	NARDI	Italy
18	APERAM STAINLESS FRANCE SASU	APERAM	France

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