Horizon Europe: HYPER Project:
Advancing a safe, circular, and cost competitive electrified technology for H_2O_2 production.

11 April 2023 – HYPER Horizon Europe Project Press Release

HYPER is a new project funded by Horizon Europe, the EU Framework Programme for Research and Innovation, lasting 4 years, with a budget of approximately 7M€. At the core of HYPER project is the electrification of H_2O_2 production, and in turn its modular on-site and on-demand production potentially applicable to multiple industries: pulp and paper, textile, electronics, chemicals/ coatings, sanitisation, and water treatment.

Remarkably, the project contributes to the achievement of four of the United Nations Sustainable Goals;

- number 8 - Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all,
- number 9 - Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation,
- number 12 - Responsible consumption and production by adopting waste as an input source in a circular economy paradigm, and
- number 13 - Take urgent action to combat climate change and its impacts

Beyond the SDGs, HYPER strongly addresses the EU Green Deal challenges by transforming the EU's economy for a sustainable future, decreasing GHG emissions and greening the chemical industry.

HYPER's world class consortium brings expertise to the entire value chain and with a strong industrial commitment to maximise exploitation through practical implementation. Together the consortium aims to transform H_2O_2 production from a large-scale, energy intensive chemical process to a smaller-scale, robust, modular, sustainable, electrochemical process, providing substantial economic and environmental benefits.

The research focus of HYPER is to develop a unique electrochemical process for the production of H_2O_2 via persulfate, a compound that has higher oxidation potential and is more stable than H_2O_2. This flexible and modular electrified process can advantageously replace the current fossil fuel-based auto-oxidation (AO) production process, and provide improved energy and material efficiency that will result in GHG emissions savings. The anodic oxidation will be paired with useful cathodic reductions, such as H_2 production and material recovery/emissions (NOx/SOx) reductions, in a low waste and circular economy approach. HYPER's vision is to set up optimised scenarios for electrification in chemicals (coatings), textile and pulp and paper sectors, covering a major part of the current H_2O_2 market.

HYPERs electrified process will be able to work using intermittent and unpredictable renewable energy sources (RES). Indeed, HYPER will develop a digital twin, to simulate the dynamic operation with intermittent renewable power and to analyse how the full-sized system would be able to function as a grid balancing service (ancillary services, balancing market). This data will feed into the identification of routes

for improved commercial viability. This will ensure the efficient integration of RES to drive the conversion process in a reliable manner.

The expected outcomes will revolutionise the production of H_2O_2 from its traditional centralised energy intensive production, which has a significant CO_2 footprint, into a modular, robust, on-site production, allowing for on-demand H_2O_2, decreasing CO_2 emissions both directly and indirectly, as well as reducing the consumption of critical raw materials and the generation of hazardous waste.

About HYPER:

HYPER – An electrochemically produced oxidiser for modular, onsite generation of HYdrogen PERoxide, started on the 1st January 2023, running for 48 months.

The consortium, coordinated by SINTEF (Norway), includes 12 beneficiaries from 9 countries: ANDRITZ (Finland), CONDIAS (Germany), ETA-Florence (Italy), INERIS (France), Jožef Stefan Institute (Slovenia), Process Design Center (The Netherlands), Kemijski inštitut - National Institute of Chemistry (Slovenia), AristEng S.à r.l. (Luxembourg), INOTEX spol. s r.o. (Czech Republic), KANSAI HELIOS Group (Slovenia), Eilenburger Elektrolyse- und Umwelttechnik GmbH (Germany).

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HYPER
ELECTRIFIED CHEMISTRY

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