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Development Project for next generation PEM electrolyzers

Schaeffler, Johnson Matthey, Bekaert and TNO partner to boost the efficiency of renewable hydrogen production

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- International consortium of Schaeffler, Bekaert, Johnson Matthey and TNO work on shared research project in the field of hydrogen
- The goal is to accelerate Proton Exchange Membrane (PEM) technology development, by optimizing the components of the electrolyser stack
- Research programme will span three years and lay the foundation for a highly efficient, durable and lower cost generation of electrolyzers

Schaeffler, a leading global supplier to the automotive and industrial sectors, Johnson Matthey, a global leader in sustainable technologies, has partnered with Bekaert, a leading porous transport layer supplier for PEM electrolyzers and TNO, a leading independent research institute in the field of hydrogen to develop cells with the components optimized to work together for a step-change in efficiency to be used within electrolysis. The consortium brings together each company's leading individual capabilities to drive forward next generation technologies to reduce the levelized cost of hydrogen and improve component efficiency. The shared research programme will run over the next three years.

Renewable hydrogen will play a role in all net zero scenarios and is critical in decarbonising hard-to-abate sectors. Electrolysis is the technology used to produce renewable hydrogen with water and power from renewables, and is therefore a key enabling technology for zero emission energy. The IRENA 1.5°C scenario forecasts approximately 5,000 GW of electrolyser capacity in 2050, which will enable sufficient hydrogen to meet 12% of total energy demand globally. But to ensure this happens, technology innovation and accelerated adoption are crucial.

The consortium's goal is to accelerate PEM technology development, by optimizing the most important components of the electrolyser stack. This will ultimately support the development of the next generation of PEM electrolyzers, enabling lower electricity consumption, cheaper hydrogen production and smaller footprint. The team will also investigate more efficient use of scarce critical elements and components which offer increased efficiency over today's electrolyzers.

To achieve this, the partners will collaborate in a shared research programme which will span three years and lay the foundation for a highly efficient, durable and

lower cost generation of electrolyzers. This is part of the VoltaChem program, a business-driven Shared Innovation Program that supports the chemical industry, the energy sector, and equipment suppliers & licensors to move towards a climate neutral future.

“We are very proud that we are able to contribute to the competitive production of green hydrogen and to support this team of strong international business partners with our experience and developments in the field of PEM water electrolysis,” says Bernd Hetterscheidt - Senior Vice President Strategic Business Hydrogen at Schaeffler. “Enabling and accelerating the energy transition is one of the core objectives of our strategy at Schaeffler and is an essential part of our Roadmap 2025, which comprises a fast ramp-up of a highly competitive, scalable stack production process. We strongly believe, that participating in such promising projects as the Next Gen electrolysis Shared Research Program with global leading partners is the right way to drive this technology forward.”

This leading international consortium of Schaeffler, Bekaert, Johnson Matthey and TNO will jointly work on the shared research. To further accelerate, the research programme is open to new participants.

Quotes by Partners:

“TNO has a strong dedication to tackle global warming. We need to speed-up, accelerate innovation and the deployment of new technology. In this Next Gen electrolysis Shared Research Program we make this possible by innovating together with the international leading industry. TNO really acts as a catalyst bringing in-depth knowledge on electrolyser technology and skills in orchestrating innovation as an independent research institute.”

Richard Braal – Market director energy transition TNO

“The energy transition is gathering pace and governments are making ambitious targets to reach ‘net zero’ emissions. Green hydrogen is a truly carbon neutral solution and here we have the opportunity to drive the innovation which will make hydrogen more affordable and reliable. The collaboration envisaged by this consortium aims to accelerate not just in the area where JM is focused, but of PEM technology as a whole.”

Ralph Calmes - Managing director, Hydrogen Technologies, Johnson Matthey

“Bekaert continues to develop green and sustainable solutions for our customers thanks to our focus on components with increased performance for the electrolysis needs of the future. We work in close alignment with our innovation partners of

the Supercell project. We are committed to innovate and scale up our production footprint to GW capacity."

Inge Schildermans - VP Bekaert Fiber Technologies

"Together with our business community, we aim for accelerated innovation and implementation in Power-2-X in order to reduce the CO₂ footprint of chemicals production. It's great to see that VoltaChem members are taking the next step in their ambition together to achieve unparalleled technical performance in green hydrogen production and secure a unique position in the sustainability market. We expect that this will only be the beginning in the development of a next generation high-tech sustainable process industry."

Martijn de Graaff – Program director VoltaChem

Notes to editors:

Schaeffler Group

As a leading global supplier to the automotive and industrial sectors, the Schaeffler Group has been driving forward groundbreaking inventions and developments in the fields of motion and mobility for over 75 years. With innovative technologies, products, and services for electric mobility, CO₂-efficient drives, Industry 4.0, digitalization, and renewable energies, the company is a reliable partner for making motion and mobility more efficient, intelligent, and sustainable. Hydrogen is a strategic pillar of the Schaeffler group's future strategy, with activities in hydrogen production equipment (electrolysis), fuel cells, and the internal use of green hydrogen.

The strategic business field with focus on electrolysis has been established in the beginning of 2021 within the Industrial division of Schaeffler. Although this division is still relatively young at Schaeffler, the team can already look back on several milestones, such as a successfully completed pilot project for the production of green hydrogen from seawater in offshore wind parks. Schaeffler is also involved in the hydrogen flagship project H2Giga of the German Federal Ministry of Education and Research, as consortium leader of the sub-project "Stack Scale up - Industrialization PEM Electrolysis". The company is currently focusing on the development and manufacturing of bipolar plates as well as sub-assemblies for PEM fuel cells and PEM electrolysis stacks.

Bekaert

Bekaert (Belgium) – High electrochemical efficient porous transport layers.

Bekaert is a leader in sustainable solutions in the hydrogen market thanks to innovative products such as Titanium porous transport layers with high

electrochemical efficiency, high porosity and low Ohmic losses. Bekaert is active in the field of PEM electrolysis for more than twenty years. Bekaert products are developed with the leading OEM PEM electrolyser manufacturers. With a global footprint, Bekaert is the leading PTL supplier for PEM electrolyzers

Johnson Matthey

Johnson Matthey (JM), a global leader in sustainable technologies at the heart of the hydrogen economy. JM will focus on the design and manufacture of the catalyst coated membranes which operate at the heart of the electrolysis process. This business will leverage JM's deep expertise in platinum group metal science and fuel cell manufacture to drive the performance and dramatic cost reduction needed for large scale adoption of renewable hydrogen.

TNO

TNO is a leading independent applied research institute in the field of hydrogen and Power-2-X, and scalable manufacturing technologies of (components of) these systems. More than 15 research departments are collectively working on innovations along the entire hydrogen value chain from production to infrastructure, storage and final applications. From developing new materials and components in our Faraday lab, device development using these materials in combination with scalable manufacturing technologies at TNO Holst Centre, ultimately up to work on pre-feasibility and engineering studies of complete systems for large scale deployment. In the Joined innovation program VoltaChem we are dedicated to work on the next generation Power2X technologies. With a strong position in the hydrogen ecosystem, TNO is working together with the leading industrial end users, energy and infrastructure companies, material and process equipment companies, component and stack developers and system integrators.

Schaeffler Group – We pioneer motion: The Schaeffler Group has been driving forward groundbreaking inventions and developments in the field of motion technology for 80 years. With innovative technologies, products, and services for electric mobility, CO₂-efficient drives, chassis solutions and renewable energies, the company is a reliable partner for making motion more efficient, intelligent, and sustainable – over the entire life cycle. Schaeffler describes its comprehensive range of products and services by means of eight product families: From bearing solutions and all types of linear guidance systems through to repair and monitoring services. Schaeffler is with around 110,000 employees and more than 250 locations in 55 countries, one of the world's largest family-owned companies and one of Germany's most innovative companies.

Together with its partners, Schaeffler is researching components that increase the performance of PEM electrolysis stacks and thus make the production of renewable hydrogen more economical.

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