

# New Energy INNOVATION

Winter 2025

**TRUMP 2025: WHAT  
DOES IT MEAN FOR  
THE WIND INDUSTRY?**

**CLOSING THE  
BIOGAS LOOP**

**BLACK POWDER FOR  
GREEN HYDROGEN**



# Black Powder for Green Hydrogen – How Heraeus Precious Metals Enables Sustainable Hydrogen Solutions With Breakthrough Innovations.

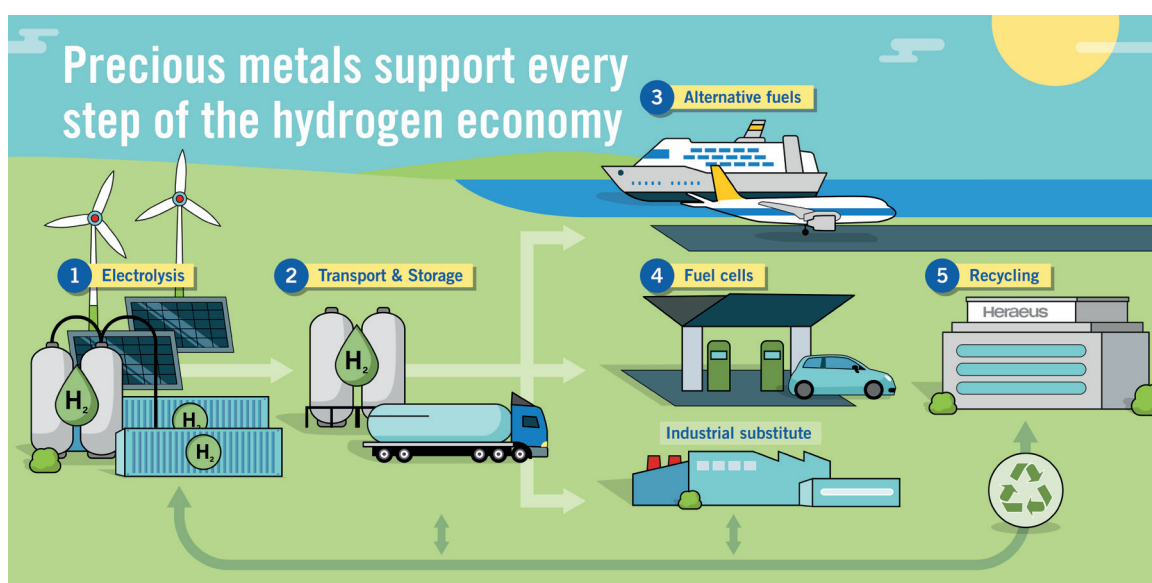
*Interview with Steffen Kitzing, Global Head of Sales Hydrogen Systems at Heraeus Precious Metals.*

**Who is Heraeus Precious Metals and what are you doing specifically for the Hydrogen Economy?**

Heraeus Precious Metals is one of the world's largest refiners of precious metals and a global leader in the precious metals industry. We combine trading, innovative products, and recycling to offer our customers the industry's most comprehensive array of services for the entire precious metals lifecycle.



In the Hydrogen Economy, precious metals are used in many processes. We often say, we “catalyze the hydrogen revolution”. Precious metal catalysts are used throughout the hydrogen supply chain for hydrogen generation, purification, storage, and transportation. And when the hydrogen is used, for example in a fuel cell or industrial applications, again precious metals are the critical component. We enable our customers to run the complete life-cycle loop for the precious metals: we help the customer to source them, we create the precious metals products they need, and we recycle the precious metals again at the end of life of their application, which is a relevant



Heraeus Precious Metals supports the hydrogen value chain in many ways: from production via electrolysis (1) and purification, through transport and storage (2), industrial application, for example for the production of alternative fuels (3), and transport related use as an energy source for fuel cells (4), to precious metal recycling (5).

part of a sustainable business case from the beginning on.

**Which precious metals are used in the hydrogen economy and what kind of problems do they solve?**

Platinum, palladium, ruthenium and iridium are the metals that are most relevant in the hydrogen economy. Production and consumption of hydrogen are mostly based on electrochemical reactions, while purification, storage, and transportation involve catalytic reactions. For all these applications precious metals catalyze the reactions with exceptional efficiency and stability. As the industry is scaling up hydrogen applications, efficiency and stability are crucial to reach cost-effectiveness, especially for green hydrogen.



Precious metals from end-of-life electrolyzers, fuel cells, and production scrap are recovered through a high-tech-recycling process.



**But precious metals are scarce and more expensive than other materials – isn't that a challenge?**

Yes, precious metals are scarce and expensive, but Heraeus has been developing innovative catalysts to reduce the amount of precious metals needed for the hydrogen economy. For example, iridium is very scarce and is indispensable for the generation of hydrogen with PEM water electrolysis. The amounts of iridium that are mined are very limited and iridium is also used to catalyze many other processes besides hydrogen. In such a situation, you need to be able to find ways to achieve the same efficiency and long-term stability with less material.

A little over two years ago, Heraeus Precious Metals launched a low loaded iridium catalyst, reducing the required amount of iridium significantly. Last year, we introduced a breakthrough new catalyst based on ruthenium that reduces the iridium amount in the same range, offering more technological options.

Currently an average of about 400 kg of iridium is used per Gigawatt for PEM-Electrolyzer Capacity. With the innovative low iridium containing catalysts, the same capacity only needs 100 kg iridium per Gigawatt. And this journey is not at its end. In the long term we see amounts between 15-30 kg iridium per Gigawatt.

With this so-called “thrifting”, precious metals are no longer a bottleneck for the hydrogen ramp up. Of course, the reduced precious metal catalysts significantly reduce the cost of electrolyzers and fuel cells. However, as we can recover the precious metals after end-of-life, precious metals capex to the business model of a plant isn't lost when the precious metals are recycled into new products.

**You recently introduced an own brand – Actydon – for the hydrogen economy. What is it about?**

The Actydon brand organizes the product families and services around electrolyzers and fuel cells. It stands for activity, efficiency and stability, and by that we mean not only our catalysts, but also the important contribution that precious metals have to make to the energy transition. Policy makers and economies set high hopes and high expectations on



Precious metals catalysts are at the core of an electrolyzer as well as the fuel cell. They catalyze the chemical reactions that are necessary to transfer electrical energy into hydrogen and vice versa.

these technologies. As the technologies are expected to grow rapidly, that also means they need to reach mature efficiency at high speed.

For our customers this environment offers a lot of challenges. They must choose the best-suited technologies and providers for hydrogen generation and consumption. For the scale-up, customers need various technical options from which to choose to achieve the optimal configuration for all elements of their electrolyzer or fuel cell design.

With the new brand, Heraeus Precious Metals has created a flexible system that can grow with the still young industry. We introduce novel developments very regularly, and the next products are already in the pipeline to be launched.

**How do you create such innovations? Do you create them on your own or are they a result of collaboration?**

Creating such innovations requires a high level of collaboration and exchange. We typically work closely with our customers in an intensive, mutual process.

Building an electrolyzer or a fuel cell stack is not just putting components together. The design is a complex system where all components need to be harmonized in an optimal way. A lot of simulations but also technical testing is involved.

It starts with comprehensive discussions

about the customer's vision. Then, in our hydrogen labs, we create customized material samples based on the discussed requirements. The technical properties of the catalyst, whether as a bulk material or a supported catalyst, the loading, the surface area, and even the production methods - all these factors can make a huge difference in the interplay with other components.

Our customers often give us the feedback that the ability to have technical discussions is crucial, as is our capability to run tests with their design. In our labs, we not only produce the catalyst and transfer it into an ink or suspension, but we can also coat membranes and test these components in our facilities to generate application-relevant data. Real test data is of high importance.

**Where can one find more about precious metals and the hydrogen economy?**

Check out our website at:

[www.heraeus-precious-metals.com](http://www.heraeus-precious-metals.com).

We have a lot of information on what precious metals do in the different processes and also a large section with publications of ours and others that provide actual data on the hydrogen economy development.

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