



[Umicore Metal Deposition Solutions electro coats bipolar plates \(BPL\) and porous transport layers \(PTL\) for PEM electrolyzers](#)

## **UMICORE PRESENTS PIONEERING PLATINUM COATING FOR TITANIUM COMPONENTS IN ELECTROLYZERS**

The Business Unit Metal Deposition Solutions of Umicore has developed an innovative and environmentally friendly platinum plating process for titanium components in electrolyzers. This technology significantly improves occupational safety during wet chemical plating of the components, as it does not require the highly corrosive or toxic chemicals that were previously necessary. Umicore is thus replacing the previous standard and ensuring more sustainable hydrogen production. The business unit has set up specially equipped production facilities worldwide for this particularly precise and therefore economical plating process.

At a time when the energy transition and the need for sustainable energy sources and storage are becoming increasingly urgent, hydrogen plays a central role as an energy carrier of the future. Among the possible processes for hydrogen production, proton exchange membrane electrolysis (PEM) has established itself as an efficient method. In contrast to the alternative alkaline electrolysis, which reacts less flexibly to volatile energy quantities (load fluctuations), PEM electrolysis can react quickly to changes in the electricity supply, making it ideal for integration into renewable energy systems and thus for the production of green hydrogen.

### **MATERIAL ESSENTIAL FOR PEM ELECTROLYZERS**

In order to withstand the demanding conditions of PEM electrolysis, titanium is used as the base material for the components. In contrast to stainless steel variants of bipolar plates (BPL) and porous transport

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layers (PTL), titanium is much more resistant in the acidic and oxidizing environment of PEM electrolysis. It also helps to maintain conductivity and adapt to high-pressure environments, which is crucial for the longevity and cost-effectiveness of electrolyzers.

The platinum plating of the components is at least as important. On the BPL side, the plating contributes significantly to longevity thanks to its corrosion resistance. Above all, however, platinum improves the performance of the electrolyzers many times over by acting as a catalyst and increasing the efficiency of the electrochemical reactions. It enables a superior electrical potential for the PTL and helps to reduce the amount of energy required for water splitting. This is particularly beneficial when the electrolyzer is powered by renewable energy, enabling the production of green hydrogen.

Titanium is a refractory metal that forms corrosion-resistant oxide layers at room temperature. This property makes it difficult to deposit platinum on BPL and PTL made of titanium. Therefore, traditionally, highly corrosive or toxic chemicals such as hydrofluoric acid have been used for plating to break down the passive oxide layers that form on titanium and generate sufficient adhesion for platinum.

Due to its highly toxic and corrosive properties, the above-mentioned hydrofluoric acid can cause serious damage to health, including severe burns, eye damage and respiratory problems, in the event of direct contact or inhalation. In addition, its use requires strict regulations and special storage containers to ensure the safety of employees and the environment. Together with the additional bureaucracy this requires, the use of such substances can no longer be reconciled with sustainability goals for a growing number of companies.

### **KNOW-HOW FOR A SAFE PROCESS**

In contrast to the conventional hydrofluoric acid process, Umicore therefore relies on a specially developed and highly innovative electro-

chemical deposition process that makes the use of such hazardous chemicals for platinization superfluous. Umicore has succeeded in reproducing and scaling up a qualitatively equivalent and permanent bond between the carrier material and the platinum layer under new process conditions.

### **ELECTROPLATING CENTERS AT THE KEY LOCATIONS**

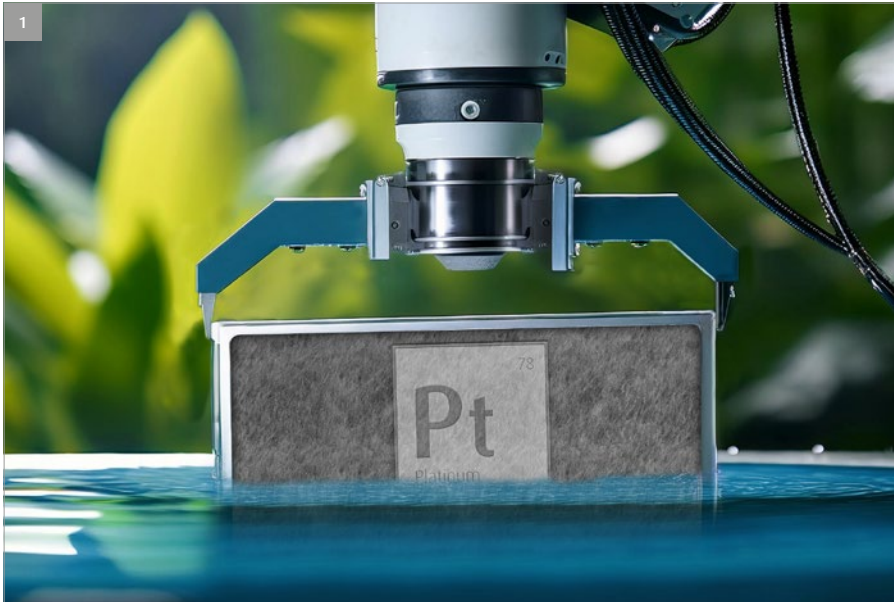
Contrary to the previous business principle, the company decided to carry out the plating exclusively itself and not to sell the electrolyte to customers via the usual electrolyte sales. "We decided to take this step due to the complexity of the process and, above all, the location requirements. We see plating - especially in this case - as our core competence and take it on for our customers with the aim of achieving the best possible platinum plating," says Sebastien Fourgeot, the project manager in charge, explaining the rather unusual procedure for the company.

Umicore MDS has therefore adapted its electroplating centers worldwide accordingly in order to be able to carry out the plating of components at any time in relative proximity to the customer and thus without long transport routes. These centers are at least partially automated and scalable, so that even large order quantities can be processed efficiently and therefore economically in a short time.

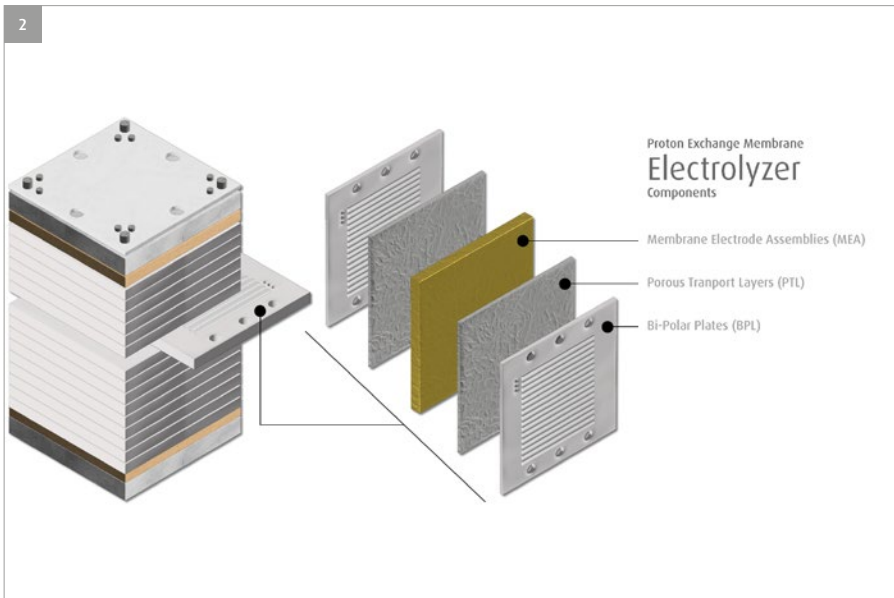
### **SOURCES AND MORE INFORMATION ONLINE:**

<https://mds.umicore.com/platuna-pem-electrolyzer>

## IMAGES



Umicore's Metal Deposition Solutions business unit has developed an innovative and environmentally friendly platinum plating solution for titanium components in electrolyzers.



Bipolar plates (BPL) and porous transport layers (PTL) made of platinized titanium make proton exchange membrane electrolysis (PEM) significantly more efficient.

## IMAGES

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The German company has succeeded in producing a qualitatively equivalent and durable bond between the BPL and PTL base material titanium and the platinum to be applied without the use of highly corrosive or toxic chemicals.

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Umicore MDS has adapted its electroplating centers worldwide to be able to carry out the plating of titanium components for PEM electrolyzers close to the customer at any time and without long transport routes.

## IMAGES



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Logo Umicore

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## ABOUT UMICORE METAL DEPOSITION SOLUTIONS

Within the Umicore Group, the Metal Deposition Solutions (MDS) business unit is the business headquarters for the two established business lines Electroplating and Thin Film Products. Metal Deposition Solutions is one of the world's leading suppliers of products for the (precious) metal-based coating of surfaces in the nanometer and micrometer range - with the expertise of the two divisions we combine the two highest-quality processes: Electroplating and PVD coatings.

The business unit's solutions are used in many everyday products or make their production possible in the first place. Almost all well-known manufacturers in the electronics, automotive, optics and jewelry industries source components coated with our Umicore products either directly or indirectly.

In addition to development and production, Metal Deposition Solutions offers a comprehensive service for their products. This includes, for example, recycling or precious metal management in addition to consulting and on-site technical support.

Further information: [mds.umicore.com](https://mds.umicore.com)

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