

Carbon Coating Technology for Fuel Cells

Low-cost coating for metallic bipolar plates

The global hydrogen economy is expanding. To support this expansion, the demand for fuel cells for various applications, such as heavy duty, marine, aerospace, data centers etcetera is expanding as well. To be validated in terms of performance and durability, fuel cell stack components need to meet tough requirements. They need to show stable, reliable performance at high demand levels over time. In addition to these performance and durability requirements, they need to achieve acceptable price levels once scaled to high volume production. Graphite bipolar plates are being pushed out everywhere performance and durability are key factors and PVD coated metallic plates are considered the standard nowadays as they offer the right mix of formability, mechanical properties, power density and affordability.

The fundamentals

PVD coatings can significantly enhance the performance and durability of metallic bipolar plates in PEM fuel cells by improving corrosion resistance, electrical conductivity, and long-term stability. Inside a PEM fuel cell the conditions (pH and potentials) can lead to demanding conditions for its components. The BiPolar Plates (BPP's) used in these applications in most cases SS-316L are prone to ion-leeching and the formation of insulating (oxide) layers. Both ion-leeching and oxide formation of the BPP's can compromise the integrity of the fuel cell stack.

Ionbond solutions

The Ionbond PVD carbon coating offers excellent electrical conductivity and corrosion resistance and has been adopted by several OEM's globally. We have proven that the coating is perfectly suitable for 20.000+ hours in a.o. demanding heavy duty environments. At Ionbond we can support from initial sampling towards prototyping to eventually scale up towards (high) volume production on industrial sized batch and inline coating platforms. We actively collaborate in this specific field with our sister company Hauzer Techno Coating B.V. as our standard equipment supplier and can offer the full scaling trajectory towards in-house PVD coating production connected in your manufacturing line with own equipment.

We offer coating solutions for metallic bipolar plates and bipolar plate assemblies, current collectors and endplates. The fuel cell types we have successfully supported with our PVD coatings so far are PEM fuel cells, HT-PEM fuel cells, direct methanol fuel cells and reversible fuel cells.

Contact

Kindly reach out to learn more about our protective and conductive coating portfolio for fuel cell components.

