

International Thermal Spray Conference and Exposition, ITSC 2024.

Conference webpage: <https://www.dvs-ev.de/itsc2024/>

Conference flyer: [ITSC 2024 Flyer](#)

Venue Location: Milan, Italy

Organizers: DVS (Deutscher Verband für Schweißen und verwandte Verfahren), TSS (Thermal Spray Society), and ASM International.

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Abstract

The Potential Role of Plasma Spraying in the Future of Hydrogen Production: Experiences and Challenges.

M.A. Rivera-Gil, R. Reißner, A.S. Gago, K. A. Friedrich

Institute of Engineering Thermodynamics, German Aerospace Center
Pfaffenwaldring 38-40, 70569 Stuttgart, Germany

Climate change urges technological improvements to reduce greenhouse gas emissions produced by the extensive use of fossil fuels. Hydrogen (H₂), has a proven effectiveness to store, transport, and transform energy, positioning it as a candidate to replace or reduce the use of such fuels. To achieve this, many global strategies are being developed, including intensive research around H₂ production techniques such as water electrolysis (WE), which is the main foreseeable strategy to produce clean H₂. However, the widespread usage of WE is currently constrained by intrinsic high CAPEX and/or high OPEX of the specific a) alkaline, b) proton exchange membrane (PEM), and c) anion exchange membrane (AEM) WE processes available. Plasma spraying under vacuum and atmospheric conditions, is being studied as an affordable alternative for the fabrication of low-cost catalyst layers substituting expensive platinum group metals with transition metals (e.g. Ni, Mo) and Ti-based components with steel or nickel alloys, drastically reducing WE costs. This contribution depicts the plasma spraying activities that have been carried out in this topic and outlines the limitations and challenges which must be hindered to promote WE as a cost-benefit effective technique for mass clean H₂ production, with aims to contribute to society decarbonization.
