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Keynote Speaker, Dr. Nicholas Curry, Northwest Mettech / Thermal Spray Innovations

Liquid Feedstock Plasma Spray - Past, Present, Future?

Abstract:
Liquid feedstock plasma spraying was once positioned as a disruptive evolution of thermal spray technology—promising microstructural control beyond the limits of conventional powder-based processes. Over the past two decades, this promise has been partially realised. Technologies such as Suspension Plasma Spraying (SPS), Solution Precursor Plasma Spraying (SPPS) and Hybrid Spraying have enabled unique coating architectures and produced some industrial applications most notably columnar thermal barrier coatings for aerospace and protective coatings for semiconductor manufacturing equipment.

Yet, despite a number of technical advantages, liquid feedstock plasma spray has not achieved widespread industrial dominance. Why? Is the technology inherently too complex, or have we failed to fully grasp the processes maximum capabilities? Persistent challenges remain in fundamental process physics understanding, feedstock sourcing and design, equipment selection and process scalability—raising a critical question: are these barriers technical, or systemic?

This keynote will revisit the evolution of liquid feedstock plasma spray through the lens of past expectations, present realities, and future potential. It will challenge established assumptions across the full process chain—from feedstock formulation and injection strategies to plasma system design and coating formation mechanisms. Particular attention will be given to where the technology delivers truly unique value—and where it does not.

Looking forward, the field stands at a crossroads. Advances in plasma torch design, digital process control, and hybrid manufacturing approaches offer new opportunities—but competing technologies are rapidly evolving. Will liquid feedstock plasma spraying define the next generation of functional coatings, or remain a niche solution?

By confronting both the strengths and limitations of the technology, this presentation aims to provoke discussion on what is required to move from capability to true industrial impact.

Biography:
Consultant in thermal spray technology since 2020. • Studied Materials Science and Engineering at University of Manchester, United kingdom. Graduating in 2008. • Received his PhD from University West, Sweden, in the field of Thermal Barrier Coatings. • In 2014, joined Treibacher Industrie AG in Austria as Thermal Spray Specialist and Finally R&D division leader for thermal spray materials from 2016. • Since 2020 he has been working as a consultant supporting companies Northwest Mettech, SalloyTech, Entech AB and various OEM's on thermal spray topics