Richard Trache, TREIBACHER INDUSTRIE AG

Title: “Thermally Sprayed EBCs – Feedstock considerations for a sustainable future”

Abstract:
The way to greener aviation is paved by two key principles: lightweight design and cleaner propulsion systems. Environmental barrier coatings (EBCs) are the latest generation of thermal spray coatings in the hot section of the turbine engine. As super alloys are replaced by lighter ceramic matrix composites (CMCs) as construction material, the focus of the protective coatings shifted from thermal barrier to water vapor barrier. At least one manufacturer introduced and approved CMCs for its latest engine designs, others will likely follow. From a coating point of few there are multiple feedstock options: fused and crushed powder, agglomerated and sintered powder or suspensions. However, the coating design is complex from a gas tight layer to protect against water vapor to an abradable coating, sealing the gap between blades and turbine casing. Moreover, rare earth silicates, the material of choice for EBCs, holds some challenge like silica loss and phase transitions on top of the common issues like residual stress and pore formation during spraying.

This presentation collects the available information to compare the three different types of feedstock with regards to manufacturing, handling and the resulting coating quality. Thereby, a special focus is placed on phase purity, coating porosity and residual stress formation.

Biography:
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Dr. Richard Trache studied Chemical Engineering and Materials Science at Dresden Technical University in Germany and brings over 17 years of experience in thermal spray technology. Throughout his career, Dr. Trache has conducted research on various applications, including wear-resistant coatings, electrical and thermal insulation, utilizing techniques like APS, HVOF, and HVAF. Notably, his doctoral thesis focused on advancements in suspension spraying technology. Currently leading Treibacher's Thermal Spray Center and research group for thermal spray materials in Austria, Dr. Trache spearheads the development of innovative powders and suspensions. His international experience includes research visits to Canadian National Research Council and University West in Sweden.