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Title: “SPS *versus* EB-PVD YSZ TBCs: Durability under Thermal Cycle in Thermal Gradient Environment”

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Abstract:

One important question lasting in the thermal spray community is the knowledge if suspension plasma spray (SPS) ZrO₂-8wt%Y₂O₃ (YSZ) thermal barrier coatings (TBCs) can reach the performance levels of their electron-beam physical vapour deposition (EB-PVD) counterparts, and to eventually replace them as the state-of-the-art TBC for aviation gas turbine engine blades. This work aims at bringing some important clarifications on this subject. The SPS YSZ TBCs were engineered using industry-produced ethanol-based suspensions (from 25wt% to 75wt%) provided Innovnano, Saint-Gobain and Treibacher. The Mettech Axial III plasma spray torch and the Polycontrols M40 suspension feeder were employed to manufacture the SPS YSZ TBCs. The benchmark EB-PVD YSZ TBCs (including the Pt/Al bond coat) were manufactured by a private industrial contractor. All TBCs were deposited on single-crystal Rene N515 substrates. The bond coat material for the SPS YSZ TBCs was the NiCoCrAlY+HfSi; produced via air plasma spray (APS). The performance comparison amongst all these TBCs in thermal gradient cycling (5 min hot & 2 min cool cycles) was undertaken via a thermal gradient laser-rig testing system. These are released results from the Surftec Thermal Spray Industrial R&D Group of the National Research Council of Canada (NRC).

Biography:

Dr. Rogério Lima obtained his PhD degree in Materials Science & Engineering at the Center for Thermal Spray Research of the State University of New York at Stony Brook (USA); studying under the mentorship of Prof. Chris Berndt (now Distinguished Professor at Swinburne University of Technology – Australia). Right after his PhD graduation in 2001, Dr. Lima joined the Thermal Spray Team of the National Research Council of Canada (NRC) as a Research Associate and was awarded permanent position in 2006. He currently holds the position of Senior Research Officer at the NRC. Dr Lima’s main scientific interest is R&D of thermally sprayed thermal barrier coatings (TBCs) and environmental barrier coatings (EBCs) for aerospace applications.