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Preferred Presentation Format: **ORAL**
Suggested Session Topic: **Nanomaterial Coatings and Solution Precursors**

HVOF Sprayed Nanostructured Al_2O_3 - TiO_2 Coatings: An Enhanced Wear Performance

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In previous studies, it has been demonstrated that nanostructured Al_2O_3 -13wt% TiO_2 coatings deposited via air plasma spray (APS) exhibit higher wear resistance when compared to that of conventional coatings. This study aimed to verify if high velocity oxy-fuel (HVOF) sprayed nanostructured Al_2O_3 -13wt% TiO_2 could improve even further the already recognized good wear properties of the APS nanocoatings. According to the abrasion test results (ASTM G 64), the volume loss during wear testing was reduced by a factor 10 for the HVOF-sprayed nanostructured coating as compared to the best performing APS conventional coating. When comparing both nanostructured and conventional HVOF-sprayed coatings, there was a decrease of 75% in volume loss during wear testing when using the nanostructured material. Both results show a significant anti-wear improvement by HVOF spraying the nanomaterial. Scanning electron microscopy (SEM) at low/high magnifications showed the distinctive microstructure of the HVOF-sprayed nanostructured coating, which helps to explain its excellent wear performance.

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