30. Sliding wear evaluation of hot isostatically pressed thermal spray cermet coatings


Abstract: The principal aim of this study was to compare the sliding wear performance of as-sprayed and Hot Isostatically Pressed (HIPed) thermal spray cermet (WC-12Co) coatings. Results indicate that HIPing technique can be successfully applied to post-treat thermal spray cermet coatings for improved sliding wear performance, not only in terms of coating wear, but also in terms of the total volume loss for test couples. WC-12Co coatings sprayed by a HVOF system were deposited on SUJ-2 bearing steel substrate and then encapsulated and HIPed at 850 °C for one hour. A high frequency reciprocating ball on plate rig was used to measure the sliding wear resistance of these coatings in dry conditions under steel and ceramic contact configurations at two different loads. Results are discussed in terms of coating microstructure, microhardness, fracture toughness and residual stress evaluations. Microstructural investigations indicate fundamental changes in grain morphology, whereas x-ray diffraction revealed beneficial transformations in phase composition of these coatings during the HIPing post treatment. The effects of these microstructural changes on the physical properties and wear resistance are discussed. (30 refs.)

Ei controlled terms: Sprayed coatings | Wear of materials | Hot isostatic pressing | Cermets | Ceramic coatings | Steel | Substrates | Wear resistance | Microstructure | Microhardness | Fracture toughness | Residual stresses | Morphology

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