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Improving the high temperature abrasion resistance of thermally sprayed Cr_3C_2 -NiCr coatings by WC addition

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Abstract

Two experimental agglomerated and sintered (a&s) feedstock powders were prepared, in order to reveal the role of WC addition on the microstructure, hardness, and the abrasion resistance of HVOF-sprayed Cr_3C_2 -NiCr coatings. These powders contained 10 wt.% of sub-micron WC, 20 or 10 wt.% of nickel binder, and Cr_3C_2 as balance. Experimental coatings were deposited by a liquid fueled high velocity oxygen-fuel (HVOF) spray process and subsequently heat treated at 800 °C for 8h to simulate elevated temperature service conditions. The microstructures of the powders and coatings were studied by SEM and X-ray diffraction, and the hardnesses of coatings were probed by means of micro and nanoindentation. In addition, the high stress abrasion resistance was tested in a temperature range from room temperature up to 800 °C. The microstructural characterization of the coatings displayed the presence of WC and tungsten containing Cr_3C_2 grains. The

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