## Effect of annealing temperature on the microstructureevolution, mechanical and wear behavior of NiCr–WC–CoHVOF-sprayed coatings

## Azzeddine Mazouzi, Boubekeur Djerdjare, Salim Triaa, Amine REZZOUG, Billel CHENITI, Samir M. Aouadi.

**Abstract:** In the present work, the effect of annealing temperature on the microstructure, mechanical and tribological properties of NiCr–WC–Co coatings produced by the high-velocity oxy-fuel (HVOF) technique has been investigated. X-ray diffraction and scanning electron microscopy revealed the dissolution of WC into the NiCr matrix to form W2C and Cr3C2 with the annealing process. This dissolution became complete at 800 °C. The mechanical properties of the coatings were investigated using nano-indentation and Vickers fracture toughness measurements. These measurements suggested that the hardness, Young's modulus, and fracture toughness values increased because of the newly formed carbide phases as a result of the dissolution of the WC particles. The overall properties of the coatings were found to be optimum for annealing temperatures of 800 °C. The wear mechanism appears to be abrasive in the as-sprayed coating, and it becomes a combination of an abrasive and oxidative wear with increasing the annealing temperature

Keywords : HVOF;, WC coating:, Annealing;, Wear resistance;, Nano-indentation