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PII: S0257-8972(15)30033-5
DOI: doi: 10.1016/j.surfcoat.2015.05.040
Reference: SCT 20292

To appear in: *Surface & Coatings Technology*

Received date: 18 February 2015
Revised date: 23 May 2015
Accepted date: 25 May 2015

Please cite this article as: Bo Li, Jianhua Yao, Qunli Zhang, Zhihong Li, Lijing Yang, Microstructure and Tribological Performance of Tungsten Carbide Reinforced Stainless Steel Composite Coatings by Supersonic Laser Deposition, *Surface & Coatings Technology* (2015), doi: 10.1016/j.surfcoat.2015.05.040

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Abstract: Supersonic laser deposition (SLD) is a relatively new coating technique, which combines laser irradiation with cold spray (CS). The focus of this research is on the comparison between the WC/SS316L composite coatings produced by CS and SLD respectively, with respect to deposition efficiency, WC distribution and concentration, interfacial bonding, phases in the microstructures, and tribological properties, thus to highlight the beneficial effects of laser irradiation on the composite coating produced by cold spray process. The experimental results show that deposition efficiency, WC concentration and interface bonding of the composite coating can be improved by laser irradiation due to the softening of both powder particles and substrate. The SLD composite coating has the same phases as the CS coating does because of the relatively low heat involved in this process. The high concentration and strong interfacial bonding of WC particles in the SS316L matrix significantly improves the tribological properties of the SLD composite coating.

Key Words: Supersonic laser deposition; WC/SS316L composite coating; Microstructure; Tribological properties