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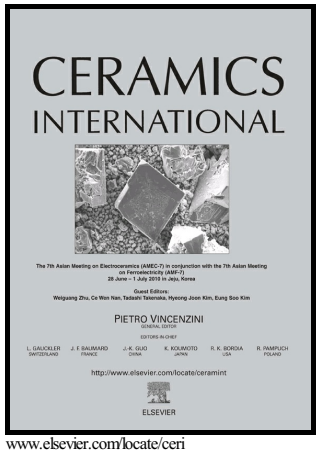

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Comparative study on the corrosion and wear behavior of plasma-sprayed vs. high velocity oxygen fuel-sprayed Al8Si20BN ceramic coatings

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Abstract

Corrosion and wear are common problems encountered in the oil and gas industry. These entail the gradual destruction of materials by mechanical action on the opposite surface, and the chemical and/or electrochemical reaction with their environment. In this research, Al8Si20BN ceramic powder with specific properties against corrosion and wear was selected, and it was sprayed with high velocity oxygen fuel (HVOF) and plasma spray methods onto carbon steel substrates. The coatings were characterized with respect to phase composition, microstructure, microhardness and adhesion strength. Their wear behavior was inspected by applying 5, 10, 15 and 20N loads by pin-on-disk machine, after which the results of both methods were compared. According to the results, the HVOF-coated models were more durable than the plasma-coated models under different loads in the same condition. In addition, the corrosion deterioration of the coated specimens in both brine (3.5% NaCl) and fossil oil were tested for one month (30 days). Potentiodynamic polarization and electrochemical impedance spectroscopy (EIS)