

Corrosion Behavior Of HVOF Coated Sheets

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Summary

High velocity oxygen-fuel (HVOF) thermal spray coating finds application in industry due to its superior resistance to corrosion and thermal loading. In the HVOF process, the metallic powders at elevated temperature are sprayed at supersonic speed onto a substrate material. The powder granules sprayed impact onto each other, forming a mechanical bonding across the coating layer. In most of the cases, the distances among the particles (powder granules sprayed) are not the same, which in turn results in inhomogeneous structure across the coating layer. Moreover, the rate of oxidation of the powder granules during the spraying process varies. Consequently, the electrochemical response of the coating layer surfaces next to the base material and free to atmosphere differs. In the current study, the electrochemical response of a coating sheet formed during HVOF thermal spraying was investigated. NiCrMoNb alloy (similar to Inconel 625) was used for the powder granules. Thermal spraying was carried out onto a smooth surface of stainless steel workpiece (without grid blasting), and later the coating layer was removed from the surface to obtain the coating sheet for the electrochemical tests. It was found that the corrosion rate of the smooth surface (surface next to the stainless steel surface before its removal) is considerably larger than that corresponding to the rough surface (free surface) of the coating sheet, and no specific patterns were observed for the pit sites.

References:

1. DOBLER K, 2000, J THERM SPRAY TECHN, V9, P407
2. HOFMAN R, 1998, MATER SCI FORUM 12, V289, P641
3. KEMBAIYAN KT, 1995, WEAR, V186, P487
4. NATISHAN PM, 2000, SURF COAT TECH, V130, P214

5. NEVILLE A, 1996, SURF ENG, V12, P303

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