Post Processed Ceramic Based Coatings on Steels using Thermal Spray

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Hard and dense ceramic coatings deposited on the surface through conventional powder flame spray (CPFS) process provide ideal solution to the poor tribological properties exhibited by some popular stainless steels like EN-36, 17-4PH etc. These steels are widely used in nuclear, fertilizer, food processing, marine industries under extreme environmental conditions. This CPFS is generally accompanied by post fusion processes like laser treatment, inductive heating, oxyacetylene flame heating etc. Post fused coatings exhibit different properties than the as-sprayed ones. The present study focuses on the comparative study of the properties of As-sprayed and post processed Al_2O_3-0.8 CeO_2-0.2 rGO coatings deposited on 17-4PH steel using CPFS. The post fusion is done by oxyacetylene flame. Further, we report the physical (density, surface roughness, hydrophobicity),Metallurgical (SEM,XRD, Raman), Mechanical(Hardness), Tribological (wear, scratch hardness, corrosion) characterization of both As-sprayed and post processed coatings. The comparison of the properties will help us to reveal the necessity and challenges of post fusion of such coatings.

Keywords: Thermal spray process, CPFS, ceramic coating, hardness, oxyacetylene heating, post fusion

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