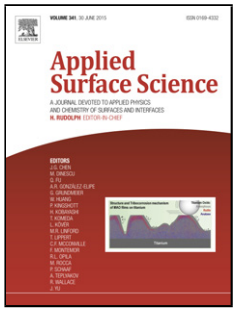

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Influence of coating defects on the corrosion behavior of cold sprayed refractory metals

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Highlights

The defects in the cold sprayed coatings are critical in the case of corrosion performances of the coatings in aggressive conditions. To understand the influence of coating defects on corrosion, immersion tests have been carried out in 5 wt % HF solution for the cold sprayed and heat treated Titanium, Tantalum and Niobium coatings. Long duration immersion tests reveal inhomogeneous weight losses of the samples prepared at different heat treatment conditions. The weight loss for different coatings has been well corroborated with the coating defects and microstructures. Chemical and micro structural analysis elucidates the reason behind the inhomogeneous performance of different type of cold sprayed coatings in corrosion medium. In the case of cold sprayed titanium, formation of stable oxide along the inter-splat boundary hinders the aggressive attack of the corrosion medium which is not so in other cases.

Abstract

The defects in the cold sprayed coatings are critical in the case of corrosion performances of the coatings in aggressive conditions. To understand the influence of coating defects on corrosion, immersion tests have been carried out in HF solution for the cold sprayed and heat treated Titanium, Tantalum and Niobium coatings. Long duration immersion tests reveal inhomogeneous weight losses of the samples prepared at different heat treatment conditions. The