

عنوان مقاله:

Isothermal and Cyclic Oxidation Behavior of the Nanostructured MCrAlY Coatings Deposited by Thermal Spraying Process

محل انتشار:

مجله علوم و مهندسی خوردگی، دوره 9، شماره 37 (سال: 1399)

تعداد صفحات اصل مقاله: 16

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خلاصه مقاله:

Conventional and nanostructured NiCoCrAlY coatings were deposited developed using the high-velocity oxyfuel (HVOF) thermal spraying technique. The nanostructured NiCoCrAlY powder feedstock for the coatings was produced by the ball milling method. In this regard, the ball-milling method was used to produce the nanostructured NiCoCrAlY powder feedstock. The microstructures examinations of the as-received and nanostructured powders as well as their developed coatings were analyzed investigated by using X-ray diffraction (XRD), field emission scanning electron microscope (FESEM) equipped with energy-dispersive electron dispersed X-ray spectroscopy (EDS), and a transmission electron microscope (TEM). Due to the evaluation of the oxidation kinetics, the free-standing coating specimens were subjected to the isothermal and cyclic oxidation testing at 1000 and 1100 °C respectively, under a laboratory air atmosphere. The results indicated that the asreceived NiCoCrAlY coating had a parabolic oxidation behavior in short- and long-term oxidation exposure tests. For the nanostructured NiCoCrAlY coating, in contrast, the long-term oxidation kinetics deviated from parabolic behavior and showed instead sub-parabolic rate behavior. The obtained results also exemplified revealed that the nanostructured NiCoCrAlY coating had a greater oxidation resistance for to both cases of isothermal and cyclic conditions on account of the formation of a dense and slow-growing Al₂O₃ layer on the coating surface.

کلمات کلیدی:

پوشش نانوساختار MCrAlY، پاشش حرارتی، رفتار اکسیداسیون، آسیای مکانیکی، Ball milling، Nanostructured MCrAlY coating، Thermal spraying، Oxidation behavior

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