

عنوان مقاله:

The Effect of Titania-Halloysite Nanotubes Nanocomposite Coatings on the Corrosion Behavior of 316L Stainless Steel Substrate in Ringer Solution

محل انتشار:

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خلاصه مقاله:

Titania-halloysite nanotubes (HNTs) nanocomposite coatings were electrophoretically deposited on the 316L stainless steel substrate. Two-component suspensions of titania and HNTs particles (different ratios of titania : HNTs wt% and constant particles concentration of ۱۰g/l) in ethanol with ۰.۵g/l of polyethyleneimine (PEI) as the dispersant were used for electrophoretic deposition (EPD) experiments. EPD was performed at ۶۰V for ۱۰ and ۶۰s using a two-electrode cell. Coatings were sintered in vacuum furnace and at ۷۰۰°C for 1h. Microstructural, element mapping and EDX analysis were performed on the coatings using a SEM. It was found that HNTs reinforce the microstructure of coatings and prevent from the cracking of coatings deposited from the suspensions with HNTs>۲۵wt%. The corrosion rate of substrate coated at ۱۰ and ۶۰s using the suspensions with different ratios of titania: HNTs was measured by electrochemical polarization technique in Ringer solution and at ۳۷°C. The corrosion rate of substrates coated for ۶۰s decreased as the HNTs content increased in the suspension due to the crack-free microstructure of prepared coatings. However, the corrosion rate of substrates coated at ۱۰s increased as the HNTs content increased in the suspensions .due to the less packing density and thickness of prepared coatings

کلمات کلیدی:

Corrosion, Coating, Titania-halloysite nanotubes (HNTs) nanocomposite, Electrophoretic deposition (EPD), 316L stainless steel, خوردگی، پوشش، نانوکامپوزیت تیتانیا/ نانولوله های هالویزیت (HNTs)؛ رسوب نشانی الکتروفوریتیک (EPD)؛ فولاد زنگ نزن 316L

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