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In situ electrochemical preparation of multi-walled carbon nanotubes/polyaniline composite on the stainless steel

By: Hermas, AEA (Heramas, Abou-Elhagag A.)^[1,2]; Salam, MA (Salam, Mohamed Abdel)^[1]; Al-Juaid, SS (Al-Juaid, Salih S.)^[1]

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Abstract

Polyaniline-carbon nanotubes (PANI-CNTs) composites have been deposited via in situ electropolymerization on stainless steel (SS) surface. The presence of the oxidized multi-walled carbon nanotubes (mCNTs) in the composite was confirmed by thermal gravimetric analysis (TGA) and scanning electron microscope. Introducing 28 and 70 mg L⁻¹ mCNT in the electrolyte increased the growth rate of PANI from 38 to 67 and 83 mC/cycle, respectively. The mCNT decreases the porosity of the PANI, forming networks which held the polymer. Influences of the composite layer on the passivation and corrosion of the stainless steel were studied and compared with pure PANI layer. It was confirmed that a higher resistant passive film was formed on the steel under the composite layer compared to that formed under the pure PANI. (C) 2013 Elsevier B.V. All rights reserved.

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Author Information

Reprint Address: Al-Juaid, SS (reprint author)

- King Abdulaziz Univ, Fac Sci, Dept Chem, Jeddah, Saudi Arabia.
Organization-Enhanced Name(s)
King Abdulaziz University

Addresses:

- [1] King Abdulaziz Univ, Fac Sci, Dept Chem, Jeddah, Saudi Arabia
Organization-Enhanced Name(s)
King Abdulaziz University

- [2] Assiut Univ, Fac Sci, Dept Chem, Assiut 71516, Egypt

E-mail Addresses: ssaljuaid@hotmail.com

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