Studies on the Wear and Corrosion Resistance of Ni-Fe-Co-P-GO Composite Coating Prepared by Scanning Electrodeposition

Xiu-qing Fu^{1, *}, Xiao-xin Shi¹, Shuang-lu Duan¹, Mo-qi Shen¹, Jin-ran Lin¹, Min-Jie Jiang¹

College of Engineering, Nanjing Agricultural University, Nanjing 210031, P. R. China

*E-mail: fuxiuqing@njau.edu.cn

doi: 10.20964/2020.07.41

Received: 14 January 2020 / Accepted: 19 March 2020 / Published: 10 June 2020

In order to improve the problem of unsatisfactory wear and corrosion resistance of traditional materials, a composite coating of Ni-Fe-Co-P-GO is prepared on the surface of 45# steel by scanning electrodeposition technology. The morphology, composition and phase structures of the Ni-Fe-Co-P-GO composite coatings are characterized by scanning electron microscopy (SEM), energy spectrum analysis (EDS) and X-ray diffractometry (XRD). The surface hardness, wear resistance and corrosion resistance of the composite coatings are analyzed by means of a micro hardness tester, a comprehensive tester for surface properties of materials and an electrochemical workstation. The results prove formation of an amorphous Ni-Fe-Co-P-GO composite coating on the surface of 45# steel. The prepared Ni-Fe-Co-P-(GO)_{0.6} composite coating has maximum surface hardness with best wear and corrosion resistance due to closely connected cell structure on the surface when the concentration of graphene oxide (GO) is 0.6 g·L⁻¹.

Keywords: Scanning electrodeposition; Ni-Fe-Co-P-GO composite coating; wear resistance; corrosion resistance

[FULL TEXT](#)

© 2020 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).