Electrochemical Properties and XPS Analysis of Ni-B/SiC Nanocomposite Coatings

Weiwei Zhang^{1,*}, Baosong Li^{2,*}

¹ College of Mechanical and Electrical Engineering, Hohai University, Changzhou 213022, China

² College of Mechanics and Materials, Hohai University, Nanjing 211100, China

*E-mail: zdzdq@126.com, lbs79@126.com

doi: 10.20964/2018.04.30

Received: 17 December 2017 / *Accepted:* 30 January 2018 / *Published:* 6 March 2018

Few studies have reported the electrochemical properties and XPS analysis of Ni-B/SiC nanocomposite coatings with high wear resistance prepared by electro-co-deposition. In this study, Ni-B/SiC nanocomposite coating was prepared by electrodeposition using trimethylamine borane as boron source in a Ni-B electrolyte containing dispersed SiC nanoparticles. The corrosion resistance and anti-wear properties of the Ni-B/SiC composite coating were examined. XPS was employed to analyze the element electronic state of the coating surface. The results show that the corrosion resistance of the Ni-B/SiC composite coating was enhanced which may be related to the dense structure, barrier effect and the reduction in the active surface area of Ni-B matrix by the presence of inert SiC particles. The XPS analysis indicated that the as-deposited coating contains metallic nickel, oxide or hydroxide nickel, and the SiC particles. Ni-B/SiC nanocomposite coating with dense structure shows superior anti-corrosion and wear resistance than Ni-B and Ni/SiC coatings.

Keywords: Electrodeposition; Ni-B/SiC nanocomposite coating; wear resistance; corrosion resistance; microhardness

[FULL TEXT](#)

© 2018 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/>).