

Short Communication

Electrodeposition of Co-B hard coatings: characterization and tribological properties

A. Martínez-Hernández¹, Y. Meas¹, J.J. Pérez-Bueno¹, L.A. Ortíz-Frade¹, J.C. Flores-Segura¹,
Alia Méndez-Albores², G. Trejo^{1,*}

¹ Laboratory of Composite Materials and Functional Coatings. Center for Research and Technological Development in Electrochemistry (CIDETEQ). Parque Tecnológico Sanfandila, Pedro Escobedo, A.P. 064, C.P. 76703, Querétaro, México.

² Center of Chemistry-ICUAP Benemérita Universidad Autónoma de Puebla, Ciudad Universitaria Puebla, 72530 Puebla, México

*E-mail: gtrejo@cideteq.mx

doi: 10.20964/2017.03.59

Received: 8 December 2016 / Accepted: 19 January 2017 / Published: 12 February 2017

Electrodeposited Co-B alloy coatings were formed using dimethylamine borane (DMAB) as the boron source. The results showed that the concentration of boron in the coatings increased with increasing concentration of DMAB in the electrolytic bath. Additionally, Co-B bond formation and the presence of DMAB in the coatings were proposed on the basis of the results obtained by glow discharge spectrometry and X-ray photoelectron spectroscopy. The influence of boron concentration in the coating on the tribological characteristics of hardness, friction coefficient and wear volume are discussed. Co-B coatings without microfissures on their surface were obtained when the concentration of boron in the coating was between 2.9 and 3.0 wt.%. Co-B coatings with these boron concentrations exhibited a hardness value of 818 HV, which is higher than Ni-B coatings but lower than hard chromium coatings (867 HV). The volume of wear and friction coefficients of the Co-B coatings with 2.9 and 3.0 wt.% were also lower than those reported for Ni-B coatings.

Keywords: Co-B Alloy Coatings; Electrodeposition; Hardness; Hard Coatings; Wear Volume.

[FULL TEXT](#)

© 2017 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/>).