

Proceedings

Electrodeposited White Bronzes: A Comparison between Zn-Bearing and Zn-Free Coatings [†]

Enrico Berretti ^{1,*}, Nicola Calisi ^{2,3}, Andrea Capaccioli ⁴, Claudia Borri ³, Laura Capozzoli ¹, Abdel Magid Hamouda ⁵, Andrea Giaccherini ^{2,3}, Walter Giurlani ⁶, Andrea Ienco ¹, Stefano Martinuzzi ⁶, Massimo Innocenti ⁶, Umesh Waware ⁵, Giovanni Zangari ⁷ and Alessandro Lavacchi ¹

- ¹ CNR-ICCOM, via Madonna del Piano 10, 50019 Sesto Fiorentino (Florence), Italy; laura.aruel@gmail.com (L.C.); andrea.ienco@iccom.cnr.it (A.I.); alavacchi@iccom.cnr.it (A.L.)
- ² Industrial Engineering Department, University of Florence, via di S. Marta 3, 50139 (Florence), Italy; calisinicola@gmail.com (N.C.); andreagiaccherini@gmail.com (A.G.)
- ³ INSTM, via G. Giusti, 9 50121 (Florence), Italy; borricla@gmail.com
- ⁴ ITALFIMET Srl, via XXV Aprile 88, 52048, 52024 Monte San Savino (Arezzo), Italy; andra.capaccioli@italfimet.it
- ⁵ Department of Mechanical and Industrial Engineering, College of Engineering, Qatar University, Building B09, Doha, Qatar; hamouda@qu.edu.qa (A.M.H.); uswaware@gmail.com (U.W.)
- ⁶ Chemistry Department, University of Florence, via della Lastruccia 3, 50019 Sesto Fiorentino (Florence), Italy; walter.giurlani@unifi.it (W.G.); ste.martinuzzi@gmail.com (S.M.); m.innocenti@unifi.it (M.I.)
- ⁷ Materials Science and Engineering, University of Virginia, 351 McCormick Rd, Charlottesville, VA 22904, USA; gz3e@virginia.edu

* Correspondence: eberretti@iccom.cnr.it

[†] Presented at the 2nd Coatings and Interfaces Web Conference, 15–31 May 2020; Available online: <https://ciwc2020.sciforum.net/>.

Published: 13 May 2020

Abstract: White bronzes are ternary alloys composed of Cu, Zn and Sn, named after their bright whitish color. This class of alloys shares excellent hardness, corrosion and tarnishing resistance, and is commonly adopted in galvanic industrial processes as technological grade coatings to obtain layers with particular aesthetical and/or anticorrosive properties. Despite the widespread employment of white bronzes in fashion and the electronics industry, the recent literature lacks a characterization of these electrodeposited alloys with respect to more common binary (Cu-Sn) white bronzes. In this presentation, a thorough characterization of a commercial ternary Cu-Zn-Sn white bronze, produced by electrodeposition, is reported. Structural, chemical and physical characteristics of the deposited coating were investigated by various techniques (e.g., FIB/SEM, XPS, XRD, EDX, micro-hardness, color and corrosion tests). Results were compared with a similar set of measures obtained from a binary electrodeposited Cu-Sn white bronze (with a high tin content), in order to shed some light on the influence of Zn in the coating properties.

Keywords: electrodeposition; white bronzes; SEM; EDX; XRD; corrosion



© 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).