

Accepted Manuscript

Electrophoretic deposition and characterization of composite chitosan-based coatings incorporating bioglass and sol-gel glass particles on the Ti-13Nb-13Zr alloy



Dawid Jugowiec, Alicja Łukaszczyk, Łukasz Cieniek, Marcin Kot, Katarzyna Reczyńska, Katarzyna Cholewa-Kowalska, Elżbieta Pamuła, Tomasz Moskalewicz

PII: S0257-8972(17)30328-6
DOI: doi: [10.1016/j.surfcoat.2017.03.067](https://doi.org/10.1016/j.surfcoat.2017.03.067)
Reference: SCT 22236
To appear in: *Surface & Coatings Technology*
Received date: 21 November 2016
Revised date: 2 February 2017
Accepted date: 28 March 2017

Please cite this article as: Dawid Jugowiec, Alicja Łukaszczyk, Łukasz Cieniek, Marcin Kot, Katarzyna Reczyńska, Katarzyna Cholewa-Kowalska, Elżbieta Pamuła, Tomasz Moskalewicz , Electrophoretic deposition and characterization of composite chitosan-based coatings incorporating bioglass and sol-gel glass particles on the Ti-13Nb-13Zr alloy. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Sct(2017), doi: [10.1016/j.surfcoat.2017.03.067](https://doi.org/10.1016/j.surfcoat.2017.03.067)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Electrophoretic deposition and characterization of composite chitosan-based coatings incorporating bioglass and sol-gel glass particles on the Ti-13Nb-13Zr alloy

Dawid Jugowiec¹, Alicja Łukaszczyk², Łukasz Cieniek¹, Marcin Kot³, Katarzyna Reczyńska⁴,
Katarzyna Cholewa-Kowalska⁴, Elżbieta Pamuła⁴, Tomasz Moskalewicz¹

¹ AGH University of Science and Technology, Faculty of Metals Engineering and Industrial Computer Science, Czarnowiejska 66, 30-054 Kraków, Poland

² AGH University of Science and Technology, Faculty of Foundry Engineering, Reymonta 23, 30-059 Kraków, Poland

³ AGH University of Science and Technology, Faculty of Mechanical Engineering and Robotics, Mickiewicza Av. 30, 30-059 Kraków, Poland

⁴ AGH University of Science and Technology, Faculty of Materials Science and Ceramics, Mickiewicza Av. 30, 30-059 Kraków, Poland

Corresponding author: Tomasz Moskalewicz D.Sc., Ph.D., tel: +48 12 617 4527,
e-mail: tmoskale@agh.edu.pl

Abstract

Composite bioglass/chitosan and sol-gel glass/chitosan coatings were electrophoretically deposited (EPD) on a near- β Ti-13Nb-13Zr alloy. The influence of EPD parameters, such as chemical composition and suspension pH as well as potential difference and deposition time, on the uniformity of coatings has been studied. It was found that the pH value of the suspension and chemical composition have a significant impact on the electrokinetic properties of suspended chitosan molecules and glass particles, which in turn affect the deposition rate of EPD and the uniformity of as-deposited coatings. The thicknesses of the bioglass/chitosan and sol-gel glass/chitosan coatings were up to 2 μm and 860 nm, respectively. The microstructure of the coatings was characterized by scanning and transmission electron microscopy as well as X-ray diffractometry. The coating microstructure was composed of sol-gel glass particles or amorphous bioglass separate particles or agglomerates, homogeneously embedded in an amorphous chitosan matrix. The sol-gel particles consisted of hydroxyapatite (hp), CaSiO_3 (tp) phases. The sol-gel glass/chitosan coating exhibited better adhesion to the titanium alloy substrate than the

Download English Version:

<https://daneshyari.com/en/article/5465366>

Download Persian Version:

<https://daneshyari.com/article/5465366>

[Daneshyari.com](https://daneshyari.com)