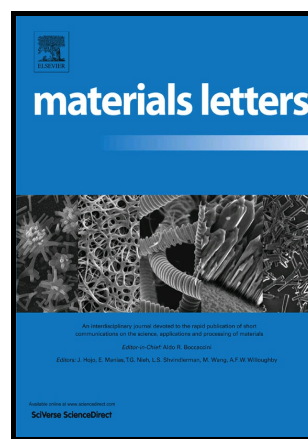


Author's Accepted Manuscript

Preparation and Characterization of Novel sol-gel derived Hydroxyapatite/Fe₃O₄ composites coatings on Ti-6Al-4V for biomedical applications

U. Anjaneyulu, U. Vijayalakshmi



www.elsevier.com

PII: S0167-577X(16)31831-6
DOI: <http://dx.doi.org/10.1016/j.matlet.2016.11.078>
Reference: MLBLUE21772

To appear in: *Materials Letters*

Received date: 27 September 2016

Revised date: 18 November 2016

Accepted date: 22 November 2016

Cite this article as: U. Anjaneyulu and U. Vijayalakshmi, Preparation and Characterization of Novel sol-gel derived Hydroxyapatite/Fe₃O₄ composite coatings on Ti-6Al-4V for biomedical applications, *Materials Letters* <http://dx.doi.org/10.1016/j.matlet.2016.11.078>

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 galley proof before it is published in its final citable 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.

Preparation and Characterization of Novel sol-gel derived Hydroxyapatite/Fe₃O₄ composites coatings on Ti-6Al-4V for biomedical applications

U. Anjaneyulu, U. Vijayalakshmi*

Department of Chemistry, School of Advanced Sciences, VIT University, Vellore -632014. Tamil Nadu, India.

vijayalakshmi.u@vit.ac.in

lakesminat@yahoo.com

Tel.: +91 416 2202464; fax: +91 416 224 3092

Abstract

In this study, for the first time we have developed the composite coatings using sol-gel derived hydroxyapatite [HAP: (Ca)₁₀(PO₄)₆(OH)₂] and magnetite (Fe₃O₄) on alkali treated Ti-6Al-4V alloy using various concentrations of Fe₃O₄ nanoparticles such as 1, 3 and 5 wt% respectively. The fabricated composite coatings were characterized by XRD, SEM-EDAX and contact angle measurements. *In vitro* bioactivity study confirmed that the composite coated Ti-6Al-4V was highly bioactive and induces bone like apatite formation in the presence of Fe₃O₄ NPs which involves the nucleus formation by developing Fe-OH groups on the surface of coatings. The corrosion resistance study proved that 1 wt% of Fe₃O₄ with HAP composite coatings exhibit good anticorrosion behaviour than the 3, 5 wt% of composites due to lower Fe-OH groups and uniform with adherent layer which restricts the leaching of ions. Hence, this finding suggested that HAP/Fe₃O₄ composites coated implants can be used for biomedical applications.

Graphical abstract

Download English Version:

<https://daneshyari.com/en/article/5463611>

Download Persian Version:

<https://daneshyari.com/article/5463611>

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