

EIGHTEENTH ANNUAL CONFERENCE

YUCOMAT 2016

Hunguest Hotel Sun Resort Herceg Novi, Montenegro,
September 5-10, 2016
<http://www.mrs-serbia.org.rs>

Programme and The Book of Abstracts

Organised by:
Materials Research Society of Serbia

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**Materials Research Society,
European Materials Research Society
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Federation of European Material Societies**

P.S.E.3.

Design and characterization of hydroxyapatite/poly(vinyl alcohol) nanocomposite coated titania scaffolds for bone repair

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Main requirements of porous scaffolds used for bone tissue engineering are easy cell penetration, distribution and proliferation, permeability of culture medium, in vivo vascularisation, adequate mechanical properties, controlled biodegradation, and ease of fabrication. Thus the work is focused on the preparation of novel tissue engineering scaffolds with suitable mechanical properties and favorable microstructure based on biodegradable polymer/inorganic nanocomposite and porous ceramic. Macroporous titania scaffolds with pore size ranging from 100 to 500 μm were obtained by polymer replica method. Uniform, a few μm thin coating composed of hydroxyapatite synthesized in presence of poly(vinyl alcohol) were obtained on the porous titania scaffolds through vacuum-assisted impregnation method while the original macroporosity and open pore structure of the titania scaffolds were maintained. The mechanical strength, degradation and in vitro bioactivity of the scaffolds were characterized.

Acknowledgment: This work has been supported by National Research Programme No.2014.10-4/VPP-3/21(IMIS2) Project No.4.