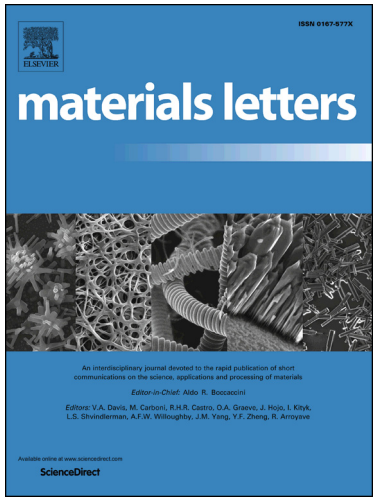

Application of MBG as a coating material on mechanically stronger but less degradable ceramic scaffolds for enhanced osteogenesis

Dandan Ye, Wei Tang, Zhengjiang Xu, Xiaobing Zhao, Guocheng Wang

PII: S0167-577X(18)30584-6
DOI: https://doi.org/10.1016/j.matlet.2018.03.202
Reference: MLBLUE 24163

To appear in: *Materials Letters*

Received Date: 23 November 2017
Revised Date: 15 March 2018
Accepted Date: 31 March 2018

Please cite this article as: D. Ye, W. Tang, Z. Xu, X. Zhao, G. Wang, Application of MBG as a coating material on mechanically stronger but less degradable ceramic scaffolds for enhanced osteogenesis, *Materials Letters* (2018), doi: https://doi.org/10.1016/j.matlet.2018.03.202

Application of MBG as a coating material on mechanically stronger but less degradable ceramic scaffolds for enhanced osteogenesis

Dandan Ye[a, b, 1], Wei Tang[b, 1], Zhengjiang Xu[b], Xiaobing Zhao[a *], Guocheng Wang[b *]

[a] School of Materials Science and Engineering, Changzhou University, Changzhou 213164, China

[b] Institute of Biomedicine and Biotechnology, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen 518055, China

* Corresponding authors: gc.wang@siat.ac.cn (G.C. Wang), zhaoxiaobing@cczu.edu.cn (X.B. Zhao)

[1] These authors contributed equally to this work.

Abstract: Improving the mechanical properties and maintaining the desired degradability of the bioceramic scaffold is always being a contradiction in the field of bone tissue engineering. To resolve this conflict, highly degradable mesoporous bioactive glass (MBG) was homogenously coated on the mechanically stronger hardystonite ($Ca_2ZnSi_2O_7$, HT) scaffolds. The presence of MBG on the scaffold covers the shortage of the bioactive ions released from the underlying HT scaffold in the initial stage and provides a better platform for cellular adhesion. Results proved that the HT scaffold coated with MBG (HT/M) exhibits appealing biological properties, pointing out their potential application in bone tissue engineering.

Keywords: hardystonite scaffold; mesoporous bioactive glass; mechanical strength; bioactive ions; osteogenesis; ceramic

1. Introduction

An ideal bone scaffold is required to have enough mechanical strength to maintain its structure for the cells and tissues ingrowth at the early stage of bone healing and be replaceable by the newly formed