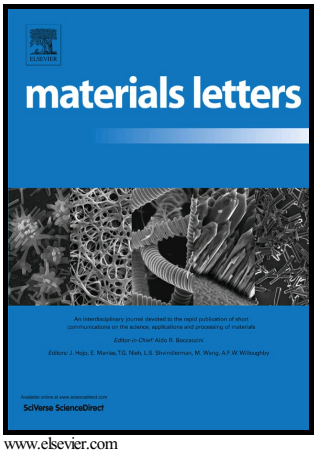

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Integrating surface topography of stripe pattern on pore surface of 3-dimensional hydroxyapatiye scaffolds

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Abstract: Surface topography is known to regulate cellular behaviour including adhesion, proliferation and differentiation on 2D surfaces. It is remaining a challenge to integrate controlled surface topographies into pore surfaces of three-dimensional (3D) porous scaffolds for bone tissue engineering so as to direct the cell behavior and inducing tissue growth. A novel and highly efficient method for integration stripe patterns into pore walls of 3-D porous hydroxyapatite (HA) scaffolds was developed using sugar spheres as porogens. The sugar spheres were accumulated as templates for HA scaffolds which were pre-heat-treated and placed in a humidity condition. The quantity of moisture on the surface of templates controlled the gelation of HA slurry prepared by dissolving powder into dilute chitin solution, so that the stripe pattern was formed on the pore wall after the HA slurry was solidified and the sugar sphere template was leached. Finally, the interconnected HA scaffold with tripe patterns on pore walls was fabricated after the sintering process. The advantage of the present process is that the interconnectivity of HA scaffold was maintained meanwhile the surface stripe pattern on pore wall was harvested. The resulted HA scaffold with surface stripe pattern is proposed to benefit cell attachment and tissue ingrowth.

Key word: Surface; Porous materials; Hydroxyapatite scaffolds; Stripe pattern.

1. Introduction

In bone tissue engineering, the scaffold material with an optimal architecture is a key factor for cell behaviour and bone formation [1]. The optimally scaffold should have a high porosity, excellent interconnectivity, and suitable surface topography.