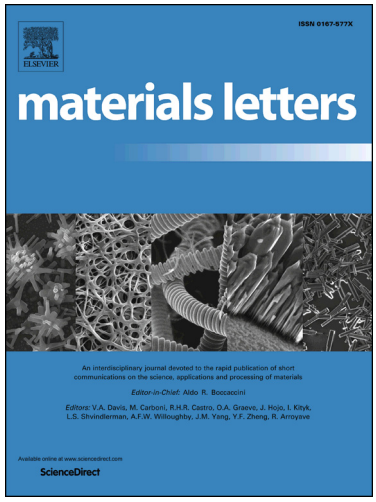

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Synthesis of mesoporous hydroxyapatite via a vitamin C templating hydrothermal route

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Abstract

Mesoporous hydroxyapatite is widely applied in biomedical and environmental fields due to its high surface area and adsorption capacity. In current work a one-step hydrothermal method to synthesize mesoporous HA was developed with the assistance of a cost-effective template vitamin C. It was observed the pore size and morphology of hydrothermally synthesized HA were correlated to applied solution composition. A combination of calcium hydroxide, orthophosphate, and vitamin C can finally result in mesoporous rod-like HA nanoparticles with surface area of 88 $m^2.g^{-1}$ and pore size of 15.7 nm on average. The mesoporous HA exhibited enhanced adsorption of model drug doxorubicin in comparison to conventionally synthesized HA as expected. Consequently, this work provides new pathway to prepare mesoporous HA with advantages of economy and convenience.

Key words

Hydroxyapatite; Nanoparticles; Powder technology; Mesoporous materials; Vitamin C

1. Introduction

Hydroxyapatite [HA, $Ca_{10(}PO_4)_6(OH)_2$] is a well-studied material for both biomedical and environmental applications [1, 2]. With the development of nanotechnology, interests have been raised to prepare various inorganic nanostructures with tailored property and function [3, 4]. One typical attempt is to increase the surface area of nanomaterial via introducing mesoporous structure. Indeed, mesoporous HA has been proved to enhance protein adsorption capacity as