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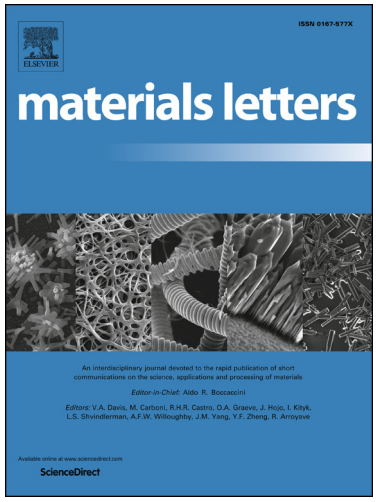

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Fabrication and characterization of hydroxyapatite nanomaterial dual deposited with nano silver and zinc oxide

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Abstract: Antibacterial biomaterial such as nano silver or nano zinc oxide has been utilized on the surface of hydroxyapatite (HA) to promote its antibacterial activity. However, it is difficult to obtain a balance between antibacterial activity and biocompatibility. In this paper, an innovative strategy is presented to fabricate HA nanomaterial with a strong antibacterial activity and a good biocompatibility. HA generated with surface deposition of nano silver and nano zinc oxide was fabricated by a two-step liquid chemical reduction method. XRD confirmed the success of dual deposition. Ion release testing indicated the dual deposition increased silver ion release rate and zinc ion release rate simultaneously.

Keywords: Biomaterials; Nanoparticles; hydroxyapatite; silver; zinc oxide; dual deposition

1. Introduction

As a famous bioceramic, hydroxyapatite (HA) has been widely utilized for bone and dental implants, tissue engineering scaffolds and coatings [1, 2]. However, lack of antibacterial activity limits its further application. Doping with antibacterial elements such as silver, zinc or copper has been applied to promote HA's antibacterial property [3, 4]. The problem with doping in the HA lattice is that low doping levels amounts cannot bring a strong antibacterial activity while high doping amounts may change the stability of HA.