

# Author's Accepted Manuscript

The growth process of hierarchical porous hydroxyapatite microspheres precipitated by propionamide and citrate through Hydrothermal synthesis

Lijing Hao, Hui Yang, Shaolong Du, Naru Zhao, Yingjun Wang



[www.elsevier.com/locate/matlet](http://www.elsevier.com/locate/matlet)

PII: S0167-577X(14)01015-5  
DOI: <http://dx.doi.org/10.1016/j.matlet.2014.05.193>  
Reference: MLBLUE17126

To appear in: *Materials Letters*

Received date: 23 February 2014  
Accepted date: 31 May 2014

Cite this article as: Lijing Hao, Hui Yang, Shaolong Du, Naru Zhao, Yingjun Wang, The growth process of hierarchical porous hydroxyapatite microspheres precipitated by propionamide and citrate through Hydrothermal synthesis, *Materials Letters*, <http://dx.doi.org/10.1016/j.matlet.2014.05.193>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# The growth process of hierarchical porous hydroxyapatite microspheres precipitated by propionamide and citrate through hydrothermal synthesis

Lijing Hao<sup>a,b,c</sup>, Hui Yang<sup>a,b,c</sup>, Shaolong Du<sup>a</sup>, Naru Zhao<sup>a,b,c,\*</sup>, Yingjun Wang<sup>a,b,c,\*</sup>

<sup>a</sup> School of Materials Science and Engineering, South China University of Technology, Guangzhou 510640, China.

<sup>b</sup> National Engineering Research Center for Tissue Restoration and Reconstruction, Guangzhou 510006, China.

<sup>c</sup> Guangdong Province Key Laboratory of Biomedical Engineering, South China University of Technology, Guangzhou 510006, China.

Tel: +86-020-87112160; Fax: +86-020-22236088; Email address: nrzhao@scut.edu.cn, imwangyj@163.com

## Abstract

Hydroxyapatite (HA) microspheres were hydrothermally synthesized by using propionamide (PA) and trisodium citrate (Cit). The capability of PA and Cit to control ions release in synthesis solution contributed to the formation of the hierarchical porous structure. The effect of hydrothermal time was investigated to explore the formation mechanism of HA microspheres. The result demonstrated that the morphology of the products transformed from microsheets to microspheres as reaction time increased. Combining with the theory of Ostwald ripening, it was proposed that earlandite nanosheets as primary building units were firstly formed from nucleation and then self-assembled into the final HA microspheres.

**Key words:** Crystal growth; Microstructure; Bioceramics; Powder technology

## 1. Introduction

Hydroxyapatite (HA) is one of the most extensively studied calcium phosphate in the field of biomaterials because of its good bioactivity and biocompatibility[1]. It is widely accepted that morphology, composition and structure have an important role in the properties and applications of HA[2, 3]. Hence, many efforts have been devoted to fabricate HA with different morphologies and microstructures. Especially, HA with three dimensional (3D) microstructures have received much attention in bone cement, drug and gene delivery[4]. Diverse template

Download English Version:

<https://daneshyari.com/en/article/8020042>

Download Persian Version:

<https://daneshyari.com/article/8020042>

[Daneshyari.com](https://daneshyari.com)