

## Accepted Manuscript

A novel method to synthesize low-cost phosphate-based particles from natural water

Tao Qin, Yuanyuan Han, Peng Zhang

PII: S0167-577X(17)31052-2

DOI: <http://dx.doi.org/10.1016/j.matlet.2017.07.017>

Reference: MLBLUE 22859

To appear in: *Materials Letters*

Received Date: 13 March 2017

Revised Date: 4 June 2017

Accepted Date: 2 July 2017

Please cite this article as: T. Qin, Y. Han, P. Zhang, A novel method to synthesize low-cost phosphate-based particles from natural water, *Materials Letters* (2017), doi: <http://dx.doi.org/10.1016/j.matlet.2017.07.017>

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 proof before it is published in its final 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.



## **A novel method to synthesize low-cost phosphate-based particles from natural water**

Tao Qin,<sup>a</sup> Yuanyuan Han,<sup>a</sup> Peng Zhang<sup>b</sup>

<sup>a</sup>The Division for Applied Material Science, Department of Engineering Science, Uppsala University, Sweden

<sup>b</sup>The Division for Nanotechnology and Functional Materials, Department of Engineering Science, Uppsala University, Sweden

Corresponding author: Tao Qin, [qt4004@163.com](mailto:qt4004@163.com)

### **Abstract**

Calcium phosphate (CaP) and magnesium phosphate (MgP) are widely used as biomaterials. A novel method for low-cost manufacturing of calcium phosphate spheres and magnesium phosphate micro particles was studied. The method focuses on novel strategies of utilizing seawater and lake water. In the natural water, the molar ratios of Mg/Ca are constant. The morphologies of the particles are determined by ratio of Ca/P. This simple method provides a prototype to synthesize low-cost inorganic spheres with natural water, which facilitate large-scale production.

Key words: Phosphate-based, spheres, seawater, lake water

### **Introduction**

Calcium phosphate particles as bioactive material have widely applications[1,2]. Compared to CaP particles, magnesium phosphate particles are not well studied even though magnesium phosphates have higher biocompatibility and faster degradation rate[3]. The recent studies demonstrated that magnesium phosphate based biomaterials can be applied in orthopaedics, bone cements, production of magnesium phosphate-polymer composite scaffolds, and as gene and drug delivery vehicles [4,5]. Current syntheses of calcium phosphate spherical particles are concentrated on spraying and self-assembly using surfactants and biomolecules[6,7]. Due to template residue, template-free methods become more popular and promising. In absence of templates, there are few reported studies[8,9]. However, there remain some challenges. The

Download English Version:

<https://daneshyari.com/en/article/5463454>

Download Persian Version:

<https://daneshyari.com/article/5463454>

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