

Accepted Manuscript

A general strategy for template-free and low-cost synthesis of inorganic hollow spheres

Tao Qin, Peng Zhang, Ishtiaq Hassan Wani, Yuanyuan Han, Klaus Leifer, Fredrik Nikolajeff, Håkan Engqvist

PII: S0032-5910(17)30506-5
DOI: doi:[10.1016/j.powtec.2017.06.051](https://doi.org/10.1016/j.powtec.2017.06.051)
Reference: PTEC 12627

To appear in: *Powder Technology*

Received date: 25 February 2017
Revised date: 14 June 2017
Accepted date: 17 June 2017



Please cite this article as: Tao Qin, Peng Zhang, Ishtiaq Hassan Wani, Yuanyuan Han, Klaus Leifer, Fredrik Nikolajeff, Håkan Engqvist, A general strategy for template-free and low-cost synthesis of inorganic hollow spheres, *Powder Technology* (2017), doi:[10.1016/j.powtec.2017.06.051](https://doi.org/10.1016/j.powtec.2017.06.051)

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 General Strategy for Template-free and Low-cost Synthesis of Inorganic Hollow Spheres

Tao Qin,^{a*} Peng Zhang^b, Ishtiaq Hassan Wani,^a Yuanyuan Han,^a Klaus Leifer,^a Fredrik Nikolajeff^a and Håkan Engqvist^a

^aThe Division for Applied Material Science, Department of Engineering Science, Uppsala University, Sweden

^bThe Division for Nanotechnology and Functional Materials, Department of Engineering Science, Uppsala University, Sweden

Corresponding author: Tao Qin, qt4004@163.com

Abstract

Inorganic hollow spheres have a great potential in many fields, such as calcium phosphate ($\text{Ca}_3(\text{PO}_4)_2$) as carriers of active ingredients and local delivery. They are typically synthesized by the methods that rely on template-based strategies. However, the template residue and energy consumption during template removal are drawbacks. Currently developed template-free methods remain challenges such as time, cost and complicated procedures. In this paper, we introduce a general low-cost and template-free precipitation method with simple procedure. A series of inorganic hollow spheres, including calcium phosphate, calcium fluoride, strontium phosphate, strontium fluoride, barium phosphate and barium fluoride via magnesium were successfully synthesized, respectively. Based on these experimental results, a new model is proposed to explain the mechanism of the hollow inorganic spheres formation. This paper provides a general method to synthesize inorganic hollow spheres, which may have an important indication to other systems.

Key words: inorganic, spheres, hollow, mechanism

Download English Version:

<https://daneshyari.com/en/article/4914981>

Download Persian Version:

<https://daneshyari.com/article/4914981>

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