

Hydrothermal synthesis and mechanism of triangular prism-like monocrystalline CeO₂ nanotubes via a facile template-free hydrothermal route

Fanming Meng, Jinfeng Gong, Zhenghua Fan, Huijie Li, Jiangtao Yuan



www.elsevier.com/locate/ceri

PII: S0272-8842(15)02222-1
DOI: <http://dx.doi.org/10.1016/j.ceramint.2015.11.123>
Reference: CERI11740

To appear in: *Ceramics International*

Received date: 30 September 2015
Revised date: 5 November 2015
Accepted date: 22 November 2015

Cite this article as: Fanming Meng, Jinfeng Gong, Zhenghua Fan, Huijie Li and Jiangtao Yuan, Hydrothermal synthesis and mechanism of triangular prism-like monocrystalline CeO₂ nanotubes via a facile template-free hydrothermal route *Ceramics International*, <http://dx.doi.org/10.1016/j.ceramint.2015.11.123>

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.

Hydrothermal synthesis and mechanism of triangular prism-like monocrystalline CeO₂ nanotubes via a facile template-free hydrothermal route

Fanming Meng^{a, b, *}, Jinfeng Gong^a, Zhenghua Fan^a, Huijie Li^a, Jiangtao Yuan^a

^a School of Physics and Materials Science, Anhui University, Hefei 230601, PR China

^b Key laboratory of Materials Modification by laser, Ion and Electron Beams (Dalian University of Technology), Ministry of Education, Dalian 116024, PR China

Abstract

Monocrystalline CeO₂ tablet-like nanostructures and triangular prism-like nanotubes were synthesized by thermal conversion of cerium carbonate hydroxide (CeOHCO₃) precursors prepared by a simple template-free hydrothermal method using Ce(NO₃)₃·6H₂O as cerium source, CO(NH₂)₂ as both precipitator and carbon source and polyvinylpyrrolidone (PVP) as surfactant. X-ray diffractometer (XRD) images inferred that the as-synthesized Ce(CO₃)(OH) has a hexagonal structure, and the CeO₂ obtained by calcining the Ce(CO₃)(OH) at 500°C for 5 h has a cubic fluorite structure. Scanning electron microscope (SEM) was employed to reveal the transformation from tablet-like to triangular prism-like structures, and then to triangular prism-like nanotubes with the increase of temperature from 120 up to 200°C. Monocrystalline structure was revealed by high resolution transmission electron microscope (HRTEM) and select area electron diffraction (SAED) patterns. The thermal decomposition process of the as-synthesized Ce(CO₃)(OH) was investigated

*Corresponding author at: School of Physics and Materials Science, Anhui University, 111 Jiulong Road, Hefei 230601, PR China. Tel.: +86 551 63861257; fax: +86 551 63861992.

E-mail address: mrmeng@ahu.edu.cn (F. Meng).

Download English Version:

<https://daneshyari.com/en/article/10624331>

Download Persian Version:

<https://daneshyari.com/article/10624331>

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