

Accepted Manuscript

Ultrafast synthesis of bifunctional Er³⁺/Yb³⁺-codoped NaBiF₄ upconverting nanoparticles for nanothermometer and optical heater

Peng Du, Laihui Luo, Xiaoyong Huang, Jae Su Yu

PII: S0021-9797(17)31417-0
DOI: <https://doi.org/10.1016/j.jcis.2017.12.027>
Reference: YJCIS 23099

To appear in: *Journal of Colloid and Interface Science*

Received Date: 29 September 2017
Revised Date: 5 December 2017
Accepted Date: 9 December 2017

Please cite this article as: P. Du, L. Luo, X. Huang, J. Su Yu, Ultrafast synthesis of bifunctional Er³⁺/Yb³⁺-codoped NaBiF₄ upconverting nanoparticles for nanothermometer and optical heater, *Journal of Colloid and Interface Science* (2017), doi: <https://doi.org/10.1016/j.jcis.2017.12.027>

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.



Ultrafast synthesis of bifunctional Er³⁺/Yb³⁺-codoped NaBiF₄ upconverting nanoparticles for nanothermometer and optical heater

Peng Du^a, Laihui Luo^{b*}, Xiaoyong Huang^{c*} and Jae Su Yu^{a*}

^a*Department of Electronic Engineering, Kyung Hee University, Yongin-si 446-701, Republic of Korea*

^b*Department of Microelectronic Science and Engineering, Ningbo University, 315211 Ningbo, China*

^c*Key Lab of Advanced Transducers and Intelligent Control System, Ministry of Education and Shanxi Province, College of Physics and Optoelectronics, Taiyuan University of Technology, Taiyuan 030024, PR China*

*Corresponding authors:

E-mail addresses: luolaihui@nbu.edu.cn (L. Luo); huangxy04@126.com (X. Huang); jsyu@khu.ac.kr (J. S. Yu)

Abstract

We reported a simple and ultrafast route to synthesize the bifunctional Er³⁺/Yb³⁺-codoped NaBiF₄ upconverting nanoparticles. It was found that the phase compositions and microstructure of the prepared samples were strongly dependent on the NH₄F content. When the NH₄F content was 14 mmol, after 1 min reaction at room temperature, the resultant compounds exhibited pure single phase and were composed of uniform spherical nanoparticles. Under 980 nm light irradiation, the synthesized nanoparticles emitted visible emissions originating from the intra-4f transitions of Er³⁺ ions and the involved upconversion luminescence mechanism was associated with the typical two-photon process. With the aid of the fluorescence intensity ratio technique, the optical thermometric behaviors of the studied nanoparticle based on the (²H_{11/2}, ⁴S_{3/2}) thermally-coupled levels in the temperature range of 303-483 K were systematically analyzed and the maximum sensor sensitivity was determined to be about 0.0057 K⁻¹ at 483 K. Furthermore, the internal heating properties of the resultant nanoparticles induced by the laser power source were also studied. With elevating the pump power from 159 to 658 mW, the

Download English Version:

<https://daneshyari.com/en/article/6992354>

Download Persian Version:

<https://daneshyari.com/article/6992354>

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