

Accepted Manuscript

Spectroscopic properties and continuous-wave laser operation of
 $\text{Er}^{3+}:\text{Yb}^{3+}:\text{LaMgB}_5\text{O}_{10}$ crystal

Yisheng Huang, Shijia Sun, Feifei Yuan, Lizhen Zhang, Zhoubin Lin



PII: S0925-8388(16)33224-8

DOI: [10.1016/j.jallcom.2016.10.115](https://doi.org/10.1016/j.jallcom.2016.10.115)

Reference: JALCOM 39282

To appear in: *Journal of Alloys and Compounds*

Received Date: 17 August 2016

Revised Date: 12 October 2016

Accepted Date: 14 October 2016

Please cite this article as: Y. Huang, S. Sun, F. Yuan, L. Zhang, Z. Lin, Spectroscopic properties and continuous-wave laser operation of $\text{Er}^{3+}:\text{Yb}^{3+}:\text{LaMgB}_5\text{O}_{10}$ crystal, *Journal of Alloys and Compounds* (2016), doi: 10.1016/j.jallcom.2016.10.115.

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.

Spectroscopic properties and continuous-wave laser operation of

 $\text{Er}^{3+}:\text{Yb}^{3+}:\text{LaMgB}_5\text{O}_{10}$ crystalYisheng Huang^{a,b}, Shijia Sun^a, Feifei Yuan^a, Lizhen Zhang^a, Zhoubin Lin^{a,c,*}

^aKey Laboratory of Optoelectronic Materials Chemistry and Physics, Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou 350002, China

^bUniversity of Chinese Academy of Sciences, Beijing 100049, China

^cState Key Laboratory of Structural Chemistry, Fuzhou 350002, China

* E-mail: lzb@fjirsm.ac.cn. Telephone: +86-59163173415. Fax: +86-59183714636

Abstract

A bulk crystal of $\text{Er}^{3+}:\text{Yb}^{3+}:\text{LaMgB}_5\text{O}_{10}$ was grown successfully by the top seeded solution growth (TSSG) method. The spectroscopic characterization of this material, including the polarized absorption and fluorescence spectra and the fluorescence decay curve, were recorded. The fluorescence quantum efficiency of the $^4\text{I}_{13/2}$ level of Er^{3+} ions and the efficiency of energy transfer from Yb^{3+} to Er^{3+} ions were estimated. Continuous-wave laser output of 160 mW at 1567 nm was realized under the absorbed pump power of 3.1 W in a hemispherical cavity. When the output coupler transmission was 1.7% the absorbed pump threshold was 1.5W and the slope efficiency of the laser was 10.1%. The results show that $\text{Er}^{3+}:\text{Yb}^{3+}:\text{LaMgB}_5\text{O}_{10}$ crystal is a promising laser material.

Keywords: Optical materials, Oxide materials, Crystal growth, Optical spectroscopy.

Download English Version:

<https://daneshyari.com/en/article/5461390>

Download Persian Version:

<https://daneshyari.com/article/5461390>

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