



## 材料合成及性能

Er<sup>3+</sup>浓度对Er<sup>3+</sup>/Yb<sup>3+</sup>共掺氟氧化物玻璃陶瓷上下转换发光的调控吴婷婷<sup>1</sup>, 赵丽娟<sup>1,2</sup>, 兰子鉴<sup>1</sup>, 常利芬<sup>1</sup>, 李一明<sup>1</sup>, 余华<sup>1</sup>1. 弱光非线性光子学教育部重点实验室南开大学物理科学学院, 天津 300071;  
2. 南开大学泰达应用物理研究院, 天津 300457

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摘要：在980 nm激光激发下，Er<sup>3+</sup>/Yb<sup>3+</sup>共掺的发光材料既可以在可见光范围产生上转换发光，也可以在近红外波段产生下转换发光，二者存在竞争关系。本文利用熔融淬火法制备了一系列掺杂不同Er<sup>3+</sup>/Yb<sup>3+</sup>浓度的氟氧化物玻璃陶瓷，测量了样品在980 nm激光激发下的上转换及下转换发射光谱。研究发现，改变Er<sup>3+</sup>的掺杂浓度可以调控上下转换的发光强度。在此基础上，提出了上下转换发光的能量传递模型。本文的研究结果有利于该类材料在不同领域中的应用。

关键词：上转换 下转换 Er<sup>3+</sup>/Yb<sup>3+</sup> 玻璃陶瓷 能量传递

Modulation of Up- and Down-conversion Emissions by Er<sup>3+</sup> Concentration in Er<sup>3+</sup>/Yb<sup>3+</sup> Co-doped Oxyfluoride Glass CeramicsWU Ting-ting<sup>1</sup>, ZHAO Li-juan<sup>1,2</sup>, LAN Zi-jian<sup>1</sup>, CHANG Li-fen<sup>1</sup>, LI Yi-ming<sup>1</sup>, YU Hua<sup>1</sup>

1. The MOE Key Laboratory of Weak Light Nonlinear Photonics, School of Physics, Nankai University, Tianjin 300071, China;

2. TEDA Applied Physics Institute, Nankai University, Tianjin 300457, China

Abstract: Oxyfluoride glass ceramics with different Er<sup>3+</sup>/Yb<sup>3+</sup> concentration were prepared by the melt-quenching method. The up- and down-conversion emissions were measured under 980 nm laser excitation. It is found that the intensities of up- and down-conversion emissions can be adjusted by changing the Er<sup>3+</sup> doping concentration. The energy transfer model of up- and down-conversion emission is proposed, which clarifies the previous disagreements about up- and down-conversion energy transfer processes. The results will be used in controlling luminescent processes at different application fields.

Keywords: up-conversion down-conversion Er<sup>3+</sup>/Yb<sup>3+</sup> glass ceramics energy transfer

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通讯作者: 赵丽娟, 余华

作者简介: 吴婷婷(1989-), 女, 山东莱芜人, 硕士研究生, 2011年于山东师范大学获得学士学位, 主要从事无机稀土发光材料与发光物理方面的研究。E-mail: wuting2011@mail.nankai.edu.cn

作者Email: zhaolj@nankai.edu.cn; yuhua@nankai.edu.cn

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