

Accepted Manuscript

Title: Ordering of fluorite-type phases in erbium-doped oxyfluoride glass ceramics

Authors: Guna Krieke, Anatolijs Sarakovskis, Maris Springis

PII: S0955-2219(17)30576-9
DOI: <http://dx.doi.org/10.1016/j.jeurceramsoc.2017.08.037>
Reference: JECS 11432

To appear in: *Journal of the European Ceramic Society*

Received date: 20-7-2017
Revised date: 18-8-2017
Accepted date: 31-8-2017



Please cite this article as: Krieke Guna, Sarakovskis Anatolijs, Springis Maris. Ordering of fluorite-type phases in erbium-doped oxyfluoride glass ceramics. *Journal of The European Ceramic Society* <http://dx.doi.org/10.1016/j.jeurceramsoc.2017.08.037>

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.

Ordering of fluorite-type phases in erbium-doped oxyfluoride glass ceramics

Guna Krieke*, Anatolijs Sarakovskis, Maris Springis

Institute of Solid State Physics, University of Latvia, 8 Kengaraga str., LV-1063, Riga, Latvia.

*Corresponding author, e-mail: guna.krieke@cfi.lu.lv

Abstract

In this study, novel transparent Er^{3+} doped glass ceramics were prepared from melt-quenched oxyfluoride glasses with general composition of $\text{Na}_2\text{O-NaF-BaF}_2\text{-YbF}_3\text{-Al}_2\text{O}_3\text{-SiO}_2$. The crystallization of fluorite (BaF_2 , $\text{BaF}_2\text{-YbF}_3$, $\text{NaF-BaF}_2\text{-YbF}_3$ and $\text{Na}_{0.5-x}\text{Yb}_{0.5+x}\text{F}_{2+2x}$) and distorted fluorite (rhombohedral $\text{Ba}_4\text{Yb}_3\text{F}_{17}$ and tetragonal $\text{NaF-BaF}_2\text{-YbF}_3$) phases was analysed in glass ceramics with different BaF_2 and YbF_3 ratio. The phase composition and microstructure were investigated by X-ray diffraction (XRD) and scanning electron microscopy (SEM). Intense red upconversion luminescence (UCL) was detected under near-infrared excitation resulting from three photon upconversion followed by cross-relaxation between Er^{3+} and Yb^{3+} ions.

The local environment of Er^{3+} ions in fluorite and distorted phases was analysed using site-selective spectroscopy. The Er^{3+} ions were found to act as nucleation centres in the glass ceramics containing BaF_2 . The phase transition from metastable fluorite to rhombohedrally and tetragonally distorted fluorite phases was detected using Er^{3+} ions as a probe.

KEYWORDS: upconversion, $\text{Ba}_4\text{Yb}_3\text{F}_{17}$, phase transition, site-selective spectroscopy, glass ceramics

Introduction

Download English Version:

<https://daneshyari.com/en/article/5440240>

Download Persian Version:

<https://daneshyari.com/article/5440240>

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