

Accepted Manuscript

Scintillation and TSL properties of MgF_2 transparent ceramics doped with Eu^{2+} synthesized by spark plasma sintering

Fumiya Nakamura, Takumi Kato, Go Okada, Noriaki Kawaguchi, Kentaro Fukuda, Takayuki Yanagida

PII: S0925-8388(17)32707-X

DOI: [10.1016/j.jallcom.2017.07.320](https://doi.org/10.1016/j.jallcom.2017.07.320)

Reference: JALCOM 42736

To appear in: *Journal of Alloys and Compounds*

Received Date: 28 April 2017

Revised Date: 4 July 2017

Accepted Date: 29 July 2017

Please cite this article as: F. Nakamura, T. Kato, G. Okada, N. Kawaguchi, K. Fukuda, T. Yanagida, Scintillation and TSL properties of MgF_2 transparent ceramics doped with Eu^{2+} synthesized by spark plasma sintering, *Journal of Alloys and Compounds* (2017), doi: 10.1016/j.jallcom.2017.07.320.

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.



Scintillation and TSL Properties of MgF₂ Transparent Ceramics Doped with Eu²⁺ Synthesized by Spark Plasma Sintering

Fumiya Nakamura^{a*}, Takumi Kato^a, Go Okada^a, Noriaki Kawaguchi^a, Kentaro Fukuda^b,
Takayuki Yanagida^a

^aNara Institute of Science and Technology (NAIST), 8916-5 Takayama-cho, Ikoma-shi, Nara 630-0192,
Japan

^bTokuyama Corporation, 1-1 Mikage-cho, Shunan-shi, Yamaguchi 745-8648, Japan
Phone: +81-743-72-6144 Email: nakamura.fumiya.nz9@ms.naist.jp

Abstract

We have developed MgF₂:Eu transparent ceramics using spark plasma sintering (SPS) and investigated the photoluminescence (PL), scintillation and dosimeter properties. Under X-ray irradiation, intense peaks appeared at 390 and 430 nm in all the samples. They were attributed to the 5d-4f transitions of Eu²⁺ and some kinds of defect centers generated by doping with Eu²⁺, respectively. The scintillation decay times of the emissions at 430 nm for the 0.01, 0.02, 0.05 and 0.1 % Eu-doped samples were 21.1, 20.9, 18.6 and 23.4 ms, respectively. Furthermore, all the samples showed a thermally stimulated luminescence (TSL) ~~glow-peak~~ over 120-250 °C. The TSL response was very sensitive to irradiation dose and showed a good linearity from 0.01 mGy to 100 mGy. The TSL emission measured at 170 °C was only by the luminescence band at 430 nm due to defect centers.

Keywords: Transparent Ceramic, MgF₂, Scintillator, Dosimeter, Eu

Download English Version:

<https://daneshyari.com/en/article/5459322>

Download Persian Version:

<https://daneshyari.com/article/5459322>

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