

Scintillation, TSL and RPL properties of MgF_2 transparent ceramic and single crystal

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



www.elsevier.com/locate/ceri

PII: S0272-8842(17)30364-4
DOI: <http://dx.doi.org/10.1016/j.ceramint.2017.03.009>
Reference: CERI14778

To appear in: *Ceramics International*

Received date: 3 February 2017
Revised date: 1 March 2017
Accepted date: 1 March 2017

Cite this article as: Fumiya Nakamura, Takumi Kato, Go Okada, Noriaki Kawaguchi, Kentaro Fukuda and Takayuki Yanagida, Scintillation, TSL and RPL properties of MgF_2 transparent ceramic and single crystal, *Ceramic International*, <http://dx.doi.org/10.1016/j.ceramint.2017.03.009>

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 galley proof before it is published in its final citable 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, TSL and RPL properties of MgF₂ transparent ceramic and single crystal

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.nasit.jp

Abstract

We have prepared MgF₂ transparent ceramics by spark plasma sintering (SPS) and investigated the scintillation and dosimeter properties compared with those of a single crystal. Under X-ray irradiation, a transparent ceramic showed scintillation with a broad feature over 300-600 nm with decay times of 310 and 1940 μ s while the single crystal did not show such emission. It was found that MgF₂ show radio-photoluminescence (RPL), which is a generation of new luminescence center by ionizing radiation. The RPL was only observed in the transparent ceramic samples, which appeared as two emission bands peaking around 415 and 700 nm under 340 $\pm$ 40 nm excitation. During the PL reading, the emission band at 415 nm effectively increased over 50 sec. This result suggested that the RPL in MgF₂ shows a build-up phenomenon. From PL emission/excitation characteristics and decay time, it was suggested that the RPL peak around 415 nm was due to M(C_{2h}) center.

Keywords: Transparent Ceramic, MgF₂, Scintillator, Dosimeter, Single Crystal

Download English Version:

<https://daneshyari.com/en/article/5437972>

Download Persian Version:

<https://daneshyari.com/article/5437972>

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