

Author's Accepted Manuscript

TL in green tourmaline: Study of the centers responsible for the TL emission by EPR analysis

Nilo F. Cano, T.K. Gundu Rao, Jorge S. Ayala-Arenas, Carlos D. Gonzales-Lorenzo, Leticia M. Oliveira, Shiguo Watanabe



PII: S0022-2313(18)30795-6
DOI: <https://doi.org/10.1016/j.jlumin.2018.09.034>
Reference: LUMIN15917

To appear in: *Journal of Luminescence*

Received date: 2 May 2018
Revised date: 13 September 2018
Accepted date: 15 September 2018

Cite this article as: Nilo F. Cano, T.K. Gundu Rao, Jorge S. Ayala-Arenas, Carlos D. Gonzales-Lorenzo, Leticia M. Oliveira and Shiguo Watanabe, TL in green tourmaline: Study of the centers responsible for the TL emission by EPR analysis, *Journal of Luminescence*, <https://doi.org/10.1016/j.jlumin.2018.09.034>

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.

TL in green tourmaline: Study of the centers responsible for the TL emission by EPR analysis

Nilo F. Cano¹, T.K. Gundu Rao², Jorge S. Ayala-Arenas³, Carlos D. Gonzales-Lorenzo²,
Letícia M. Oliveira⁴, Shiguo Watanabe²

¹Instituto do Mar, Universidade Federal de São Paulo, Rua Doutor Carvalho de Mendonça, 144, CEP 11070-100, Santos, SP, Brazil

²Instituto de Física, Universidade de São Paulo, Rua do Matão, Travessa R, 187, CEP 05508-090, São Paulo, SP, Brazil

³Escuela Profesional de Física, Facultad de Ciencias Naturales y Formales, Universidad Nacional de San Agustín (UNSA), Av. Independencia S/N, Arequipa, Peru

⁴Instituto de Pesquisas Energéticas e Nucleares, IPEN-CNEN/SP, Av. Prof. Lineu Prestes, 2242, Cidade Universitária, 05508-000 São Paulo, SP, Brazil

E-mail addresses: nilocano@if.usp.br (N.F. Cano);
jayala@unsa.edu.pe (Jorge S. Ayala-Arenas);
watanabe@if.usp.br (S. Watanabe)

*Corresponding author.

Abstract

Electron paramagnetic resonance (EPR) studies have been carried out to identify the defect centers responsible for the thermoluminescence (TL) peaks in the mineral tourmaline. The mineral exhibits three TL peaks approximately at 170, 250 and 310 °C. The EPR spectrum of the green tourmaline sample pre-heated to 500 °C presented a large signal around $g=4.3$ due to Fe^{3+} ion. Room temperature EPR spectrum of irradiated green tourmaline shows the formation of two defect centers in the region of $g=2.0$. One of the centers (center II) with a g factor equal to 1.96 is identified as an F^+ -center and is related to the observed high temperature 250 and 310 °C TL peaks. Center I exhibiting a doublet is due to hydrogen atoms (H^0), stable in the crystal lattice at room temperature and this center correlates with the TL peak at 170 °C of the green tourmaline. An optical absorption measurement also was carried out. Bands at around 430, 730 and 1100 nm have been observed.

Download English Version:

<https://daneshyari.com/en/article/10998135>

Download Persian Version:

<https://daneshyari.com/article/10998135>

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