

# Author's Accepted Manuscript

Conventional and cryo-synchronous  
photoluminescence spectra of orthorhombic  
calcium titanate

Azzah Alzahrani, Alexander Samokhvalov



PII: S0022-2313(16)30040-0  
DOI: <http://dx.doi.org/10.1016/j.jlumin.2016.06.014>  
Reference: LUMIN14043

To appear in: *Journal of Luminescence*

Received date: 11 January 2016  
Revised date: 15 May 2016  
Accepted date: 6 June 2016

Cite this article as: Azzah Alzahrani and Alexander Samokhvalov, Conventional and cryo-synchronous photoluminescence spectra of orthorhombic calcium titanate, *Journal of Luminescence*  
<http://dx.doi.org/10.1016/j.jlumin.2016.06.014>

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.

Conventional and cryo-synchronous photoluminescence spectra of orthorhombic calcium titanate

Azzah Alzahrani and Alexander Samokhvalov\*

Chemistry Department, Rutgers University, 315 Penn St, Camden, NJ 08102, USA

\*Correspondence: Alexander Samokhvalov, Department of Chemistry, Rutgers University, Camden NJ 08102 (USA). alexsam@camden.rutgers.edu.

## ABSTRACT

Alkaline earth metal titanates are broad bandgap semiconductors with applications in electronic devices, as catalysts, photocatalysts, sorbents, and superconductors. Calcium titanate  $\text{CaTiO}_3$  is of interest in the photocatalytic hydrogen generation and in electronic devices. Operation of both photocatalysts and electronic devices relies upon the pathways of relaxation of the electron in the semiconductor, including the relaxation through the midgap electronic states. We report, for the first time, characterization of electronic midgap states in the nanocrystalline  $\text{CaTiO}_3$  by synchronous photoluminescence (PL) spectroscopy at 77 K versus the “conventional” PL emission and excitation spectroscopy, and by the complementary methods. We also report the radiative transitions from the three distinct electronic midgap states in nanocrystalline orthorhombic calcium titanate.

Keywords: calcium titanate, photoluminescence, synchronous, midgap state

Download English Version:

<https://daneshyari.com/en/article/5398443>

Download Persian Version:

<https://daneshyari.com/article/5398443>

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