

Growth and piezoelectric properties of $\text{Ca}_3\text{Nb}(\text{Al}_{0.5}\text{Ga}_{0.5})_3\text{Si}_2\text{O}_{14}$ crystals with langasite structure

Kainan Xiong, Yanqing Zheng, Xiaoniu Tu, Bohan Jiang, Shuoliang Cao, Erwei Shi



PII: S0022-0248(16)30911-3
DOI: <http://dx.doi.org/10.1016/j.jcrysgr.2016.12.052>
Reference: CRY23911

To appear in: *Journal of Crystal Growth*

Received date: 20 August 2016
Revised date: 22 November 2016
Accepted date: 15 December 2016

Cite this article as: Kainan Xiong, Yanqing Zheng, Xiaoniu Tu, Bohan Jiang Shuoliang Cao and Erwei Shi, Growth and piezoelectric properties of $\text{Ca}_3\text{Nb}(\text{Al}_{0.5}\text{Ga}_{0.5})_3\text{Si}_2\text{O}_{14}$ crystals with langasite structure, *Journal of Crystal Growth*, <http://dx.doi.org/10.1016/j.jcrysgr.2016.12.052>

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

Growth and piezoelectric properties of $\text{Ca}_3\text{Nb}(\text{Al}_{0.5}\text{Ga}_{0.5})_3\text{Si}_2\text{O}_{14}$ crystals with langasite structure

Kainan Xiong, Yanqing Zheng*, Xiaoniu Tu, Bohan Jiang, Shuoliang Cao, Erwei Shi

Shanghai institute of ceramics, Chinese academy of sciences, Shanghai 200050, China

*Corresponding author. Tel.: +86 21 69987762; fax: +86 21 69987661. E-mail address: zyq@mail.sic.ac.cn

ABSTRACT

Piezoelectric crystals $\text{Ca}_3\text{Nb}(\text{Al}_{0.5}\text{Ga}_{0.5})_3\text{Si}_2\text{O}_{14}$ (CNAGS) with langasite structure have been successfully grown by Czochralski method. In this work, the crystal structure, quality, chemical composition, piezoelectric properties, electric resistivity and optical properties of the as-grown crystals were characterized. The full width at half-maximum (FWHM) of the rocking curve of CNAGS was found to be $23''$. The chemical compositions of CNAGS crystals are very close to that of initial compositions. At room temperature, the piezoelectric coefficients d_{11} and d_{14} of CNAGS crystals are 4.12 pC/N and -5.03 pC/N , and the electromechanical coupling coefficients k_{12} and k_{26} are also determined as 11.6% and 18.3%, respectively. The electric resistivity of as-growth crystal was found to be on the order of $2 \times 10^8 \Omega \cdot \text{cm}$ at 500°C and $1 \times 10^6 \Omega \cdot \text{cm}$ at 800°C . And the transmittances of CNAGS crystals were found to be over 80% in the wavelength range of 700-2700 nm.

Keywords:

A1. Crystal structure; A1. X-ray diffraction; A2. Czochralski method; B1. Gallium compounds;

B2. Piezoelectric materials

1. Introduction

Download English Version:

<https://daneshyari.com/en/article/5489609>

Download Persian Version:

<https://daneshyari.com/article/5489609>

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