

Correlations between the Structural Characteristics
and Enhanced Microwave Dielectric Properties of
V-Modified $\text{Li}_3\text{Mg}_2\text{NbO}_6$ Ceramics

Gang Wang, Huaiwu Zhang, Xin Huang, Fang Xu,
Gongwen Gan, Yan Yang, Dandan Wen, Jie Li,
Cheng Liu, Lichuan Jin



www.elsevier.com/locate/ceri

PII: S0272-8842(18)31886-8
DOI: <https://doi.org/10.1016/j.ceramint.2018.07.156>
Reference: CERI18878

To appear in: *Ceramics International*

Received date: 6 June 2018
Revised date: 13 July 2018
Accepted date: 17 July 2018

Cite this article as: Gang Wang, Huaiwu Zhang, Xin Huang, Fang Xu, Gongwen Gan, Yan Yang, Dandan Wen, Jie Li, Cheng Liu and Lichuan Jin, Correlations between the Structural Characteristics and Enhanced Microwave Dielectric Properties of V-Modified $\text{Li}_3\text{Mg}_2\text{NbO}_6$ Ceramics, *Ceramics International*, <https://doi.org/10.1016/j.ceramint.2018.07.156>

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.

Correlations between the Structural Characteristics and Enhanced Microwave Dielectric Properties of V-Modified Li₃Mg₂NbO₆ Ceramics

Gang Wang*, Huaiwu Zhang*, Xin Huang, Fang Xu, Gongwen Gan, Yan Yang, Dandan Wen, Jie Li, Cheng Liu, Lichuan Jin

State Key Laboratory of Electronic Thin Films and Integrated Devices, University of Electronic Science and Technology of China, Chengdu 610054, China

Abstract

Novel low-temperature fired Li₃Mg₂Nb_{1-x}V_xO₆ (x=0.02–0.08) microwave dielectric ceramics were synthesized by the partial substitution of V⁵⁺ ions on the Nb⁵⁺ sites. The effects of V⁵⁺ substitution on structure and microwave dielectric properties were investigated in detail. XRD patterns and Rietveld refinement demonstrated that all of the samples exhibited a single orthorhombic structure. The structural characteristics such as the polarizability, packing fraction and NbO₆ octahedron distortion were determined to establish the correlations between the structure and the microwave dielectric characteristics. The ϵ_r values presented a tendency similar to that of the polarizability. The high $Q \times f$ values were mainly attributed to the effects of the grain sizes and density rather than the packing fraction. The variation in the τ_f values was attributed to NbO₆ octahedron distortion. Notably, the Li₃Mg₂Nb_{1-x}V_xO₆ (x=0.02) ceramics sintered at 900 °C had outstanding microwave dielectric properties: $\epsilon_r=16$, $Q \times f=131,000$ GHz (9.63 GHz), and $\tau_f=-26$ ppm/°C, making these ceramics promising ultralow loss candidates for low temperature co-fired ceramics (LTCC) applications.

Keywords: Li₃Mg₂Nb_{1-x}V_xO₆ ceramics, structural characteristics, correlations

* Corresponding author:

Email address: wang_toward@163.com; hwzhang@uestc.edu.cn

Download English Version:

<https://daneshyari.com/en/article/10155389>

Download Persian Version:

<https://daneshyari.com/article/10155389>

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