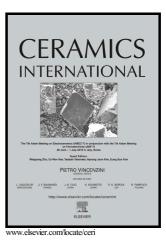
Author's Accepted Manuscript

MAGNESIUM-DOPED ZIRCON-TYPE RARE-EARTH ORTHOVANADATES: STRUCTURAL AND ELECTRICAL CHARACTERIZATION

T.H. Gayathri, A.A. Yaremchenko, J. Macías, P. Abhilash, S. Ananthakumar



 PII:
 S0272-8842(17)32061-8

 DOI:
 http://dx.doi.org/10.1016/j.ceramint.2017.09.130

 Reference:
 CERI16301

To appear in: Ceramics International

Received date: 14 June 2017 Revised date: 1 September 2017 Accepted date: 16 September 2017

Cite this article as: T.H. Gayathri, A.A. Yaremchenko, J. Macías, P. Abhilash and S. Ananthakumar, MAGNESIUM-DOPED ZIRCON-TYPE RARE-EARTH ORTHOVANADATES: STRUCTURAL AND ELECTRICAL C H A R A C T E R I Z A T I O N , *Ceramics International*, http://dx.doi.org/10.1016/j.ceramint.2017.09.130

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.

ACCEPTED MANUSCRIPT

MAGNESIUM-DOPED ZIRCON-TYPE RARE-EARTH ORTHOVANADATES: STRUCTURAL AND ELECTRICAL CHARACTERIZATION

T. H. Gayathri,^{a,c} A. A. Yaremchenko,^{b*}J. Macías,^b P. Abhilash,^{a,c}, S. Ananthakumar^{a,c*}

^aMaterials Science and Technology Division, National Institute for Interdisciplinary Science and Technology (NIIST-CSIR), Thiruvananthapuram, India-695019

^b CICECO – Aveiro Institute of Materials, Department of Materials and Ceramic Engineering,

University of Aveiro, 3810-193 Aveiro, Portugal ^cAcademy of Scientific and Innovative Research (AcSIR) – India

Abstract

Undoped LnVO₄ and magnesium-doped Ln_{0.95}V_{0.95}Mg_{0.10}O_{4- δ} (Ln = Pr, Sm, Gd, Dy and Er) orthovanadates were synthesized by solid state reaction method and characterized by XRD, SEM/EDS, electrical conductivity measurements in controlled atmospheres, and modified e.m.f. technique for determination of oxygen-ion transference numbers. XRD analysis showed the formation of phase-pure materials with tetragonal zircon-type structure and a decrease in lattice parameters with a decrease of ionic radius of rare-earth cations. Trace amounts of MgO and Mg-V-O phases revealed by SEM/EDS suggest that the solid solubility limit of magnesium cations in LnVO₄ lattice is somewhat lower than the nominal doping level, and that magnesium substitutes preferentially into the vanadium sublattice. LnVO₄ and Ln_{0.95}V_{0.95}Mg_{0.10}O_{4- δ} orthovanadates show semiconducting behavior under oxidizing conditions at 450-950°C and are predominantly oxygen-ionic conductors, except PrVO₄ that shows mixed conductivity. In the LnVO₄ series, electrical conductivity is the highest for PrVO₄ and SmVO₄ (~4×10⁻⁴ S/cm at 800°C) and decreases with increasing atomic number of rareDownload English Version:

https://daneshyari.com/en/article/7888750

Download Persian Version:

https://daneshyari.com/article/7888750

Daneshyari.com