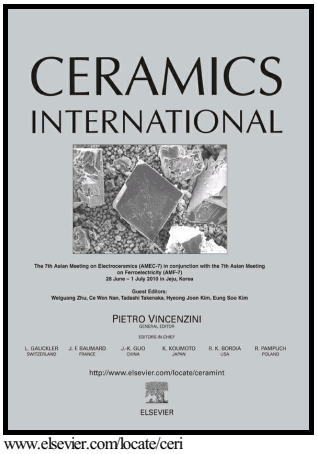

www.elsevier.com/locate/ceri

Composite microstructures and piezoelectric properties in tantalum substituted lead-free $K_{0.5}Na_{0.5}Nb_{1-x}Ta_xO_3$ ceramics

F. Jean, F. Schoenstein, M. Zaghrioui, M. Bah, P. Marchet, J. Bustillo, F. Giovannelli, I. Monot-Laffez

PII: S0272-8842(18)30475-9
DOI: https://doi.org/10.1016/j.ceramint.2018.02.163
Reference: CERI17565

To appear in: *Ceramics International*

Received date: 16 November 2017
Revised date: 12 February 2018
Accepted date: 20 February 2018

Cite this article as: F. Jean, F. Schoenstein, M. Zaghrioui, M. Bah, P. Marchet, J. Bustillo, F. Giovannelli and I. Monot-Laffez, Composite microstructures and piezoelectric properties in tantalum substituted lead-free $K_{0.5}Na_{0.5}Nb_{1-x}Ta_xO_3$ ceramics, *Ceramics International,* https://doi.org/10.1016/j.ceramint.2018.02.163

Composite microstructures and piezoelectric properties in tantalum substituted lead-free $K_{0.5}Na_{0.5}Nb_{1-x}Ta_xO_3$ ceramics.

F. Jean[1], F. Schoenstein[2], M. Zaghrioui[1], M. Bah[1], P. Marchet[3], J. Bustillo[1], F. Giovannelli[1], I. Monot-Laffez[1*]

[1] *Laboratoire GREMAN UMR 7347, Université de Tours - CNRS - INSA-CVL, IUT de BLOIS 15 rue de la chocolaterie, CS 32903, 41029 Blois Cedex, France.*

[2] *Laboratoire des Sciences des Procédés et des Matériaux, CNRS - LSPM – UPR 3407, Université Paris 13, Sorbonne Paris Cité, 99 Avenue J.B. Clément, 93430 Villetaneuse, France.*

[3] *Université de Limoges, CNRS, IRCER, UMR 7315, Centre Européen de la Céramique, 12 Rue Atlantis, 87068 Limoges Cedex, France.*

[*] *Corresponding author: Isabelle Monot-Laffez*

Email address: isabelle.laffez@univ-tours.fr

Abstract

$K_{0.5}Na_{0.5}Nb_{1-x}Ta_xO_3$ (KNNT) (with x = 0.00, 0.05, 0.10, 0.20, 0.30, 0.50 and 1) ceramics are prepared by ball milling and two calcinations at 830 °C for 5 hours. Subsequent sintering of centimeter size pellets, 1-2 mm thick, is studied using conventional and spark plasma sintering techniques with various conditions. X-Ray diffraction and Raman spectroscopy phase identification reveal orthorhombic to tetragonal phase transitions occurring at about x = 0.50, associated to chemical disorder. Scanning