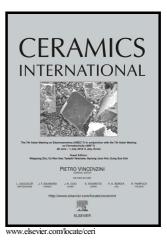
## Author's Accepted Manuscript

Glass-ceramic joining material for sodium-based battery

F. Smeacetto, M. Radaelli, M. Salvo, D. Di Modugno, A.G. Sabato, V. Casalegno, M. Broglia, M. Ferraris



 PII:
 S0272-8842(17)30553-9

 DOI:
 http://dx.doi.org/10.1016/j.ceramint.2017.03.170

 Reference:
 CERI14939

To appear in: Ceramics International

Received date: 16 December 2016 Revised date: 6 March 2017 Accepted date: 27 March 2017

Cite this article as: F. Smeacetto, M. Radaelli, M. Salvo, D. Di Modugno, A.G Sabato, V. Casalegno, M. Broglia and M. Ferraris, Glass-ceramic joining material for sodium-based battery, *Ceramics International* http://dx.doi.org/10.1016/j.ceramint.2017.03.170

This is a PDF file of an unedited manuscript that has been accepted fo publication. As a service to our customers we are providing this early version o 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**

#### Glass-ceramic joining material for sodium-based battery

F. Smeacetto<sup>1\*</sup>, M. Radaelli<sup>2</sup>, M. Salvo<sup>1</sup>, D. Di Modugno<sup>1</sup>, A. G. Sabato<sup>1</sup>, V. Casalegno<sup>1</sup>, M. Broglia<sup>2</sup>, M. Ferraris<sup>1</sup>

<sup>1</sup> Department of Applied Science and Technology, Politecnico di Torino, Corso Duca degli Abruzzi 24, 10129 Torino, Italy.

<sup>2</sup> RSE spa Power Generation Technologies and Materials Department, Via Rubattino 54, 20134 Milano, Italy.

\**Corresponding author: Dr. Federico Smeacetto, tel: +30 0110904756;* 

federico.smeacetto@polito.it

#### Abstract

This study focuses on the design, characterization and testing of a new glass-ceramic sealant for Na-based batteries. The thermo-mechanical properties as well as the sintering behaviour of the new sealant have been characterized by thermal analyses and x-rays diffraction studies. The exothermic peak in the differential thermal analysis plots has been assigned to the crystallization of a calcium sodium aluminium silicate (anorthite sodian), as confirmed by the X-ray diffraction data. The activation energy for the crystallization was found to be 482.3 kJ mol<sup>-1</sup>. The compatibility at the interface between the glass-ceramic sealant and beta- and alpha-alumina is examined before and after corrosion test with molten Na. Tests of this novel silica-based glass-ceramic sealant with Na at 300°C for 250 hours in a real battery operating conditions showed no reactions with Na or evidence of corrosion, as demonstrated by SEM post mortem examinations after cell disassembly.

Keywords: Joining; glass ceramics; Batteries; glass; Thermal properties; Al2O3 Introduction

Download English Version:

# https://daneshyari.com/en/article/5437758

Download Persian Version:

https://daneshyari.com/article/5437758

Daneshyari.com