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

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**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; Al<sub>2</sub>O<sub>3</sub>

**Introduction**

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