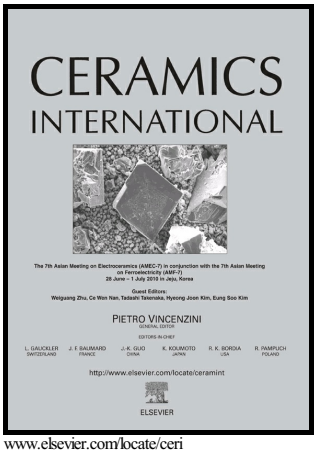

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Al_2O_3-MgO refractory castables with enhanced explosion resistance due to *in situ* formation of phases with lamellar structure

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Abstract

This work evaluated an alternative route (formic acid addition and *in situ* generation of hydrotalcite phases) to reduce the explosion trend of dense MgO-bonded refractory castables during their drying step. Aqueous suspensions containing different magnesia sources (caustic or dead-burnt) and hydratable alumina were firstly analyzed in order to identify the likelihood of generating these *in situ* compounds with a lamellar structure in mixtures prepared with and without formic acid (hydrating agent). After that, high-alumina vibratable castables containing MgO and this carboxylic acid were evaluated and the following experimental tests were carried out: thermogravimetry, mechanical strength evaluation, apparent porosity and hot elastic modulus measurements. According to the obtained results, the thermal decomposition of the formed hydrotalcite-like phases led to samples' mass loss over a broader temperature range, preventing their explosion even when a critical heating rate (20°C.min^{-1}) was