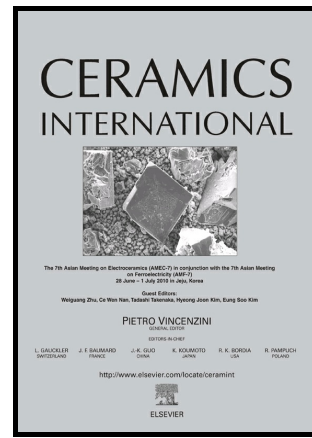


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Sintering effect of calcium carbonate in high-alumina refractory castables

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Abstract

Calcium hexaluminate (CA_6) presents interesting properties and morphology, which can be readily changed depending on specific additives and refractory processing conditions. Aiming to investigate the role of calcium carbonate in inducing the formation of elongated CA_6 grains and also identify its sintering effect during the thermal treatments of high-alumina castables, this work focused on evaluating compositions containing calcium aluminate cement, $CaCO_3$ or their blend with the help of *in situ* techniques (hot elastic modulus, assisted sintering) and other traditional methods (mechanical strength, thermal shock resistance, etc.). A sintering effect derived from $CaCO_3$ addition to alumina castables could be identified during the hot E measurements, pointing out the ability of this compound to undergo a sintering-coarsening-coalescence transformation at 500-900°C. This process also enhanced the mechanical strength and thermal shock resistance of the designed refractories at intermediate temperatures. Acicular CA_6 grains were formed in all analyzed compositions after firing at 1400°C.

Keywords: calcium hexaluminate, alumina, platelet, sintering, refractory castables.

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