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Dense alumina bodies produced by gel casting: study of chitosan and PVA as gelling agents

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Gel casting is considered, at the present, the most investigated processing method for producing three dimensional complex-shaped ceramic bodies. In this method, a based-water suspension containing binder and cross-linking agent, is poured and gelled in a nonporous mold. Green bodies can be easily produced with a wide range of sizes and shape that are readily machinable. In this work, chitosan and PVA were used as low cost and nontoxic gelling agents, with boric acid as crosslinking precursor, to produce dense alumina bodies by gel casting technique. Suspensions of alumina were produced with different water and gelling agent content. The effect of pH and gelling temperature in the rheological behavior of such suspensions were evaluated. It was possible to produce dense complex shaped alumina green bodies without defects. They presented suitable mechanical characteristics to support different stages of green bodies machining.