

## Complex-Shaped Ceramic Composites by Machining Compact Polymer-Filler Mixture

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### Abstract

Research into the preparation of ceramics from polymeric precursors is giving rise to a great interest in ceramic technology because it allows the use of several attractive polymer forming techniques. In this work ceramic composite pieces were obtained by pyrolysis of compacted mixture of a polysiloxane resin and alumina/ silicon powder. The mixture consists of 60 vol% of the polymer and 40 vol% of the filler in a ratio of 1:1 for alumina/silicon, which was thermally pressed to crosslinking the polymer, thus forming a compact body. This green body was trimmed into different geometries and pyrolysed in nitrogen atmosphere at temperatures up to 1600 °C. X ray analysis showed crystalline phases such as mullite and  $\text{Si}_2\text{O}_7$  resulting from the reaction during pyrolysis. The porosity was found to be lower than 20% and the mass loss around 10%. The complex geometry was maintained after pyrolysis and shrinkage was approximately 8%, proving to be an attractive process to form near-net-shape bulk ceramic components.

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