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## Preparation and properties of mullite-bonded porous fibrous mullite ceramics by an epoxy resin gel-casting process

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### Abstract

Porous fibrous mullite ceramics with a narrow range of pore size distribution have been successfully prepared utilizing a near net-shape epoxy resin gel-casting process by using mullite fibers, Al<sub>2</sub>O<sub>3</sub> and SiC as raw materials. The effects of sintering temperatures, different amounts of fibers and Y<sub>2</sub>O<sub>3</sub> additive on the phase compositions, linear shrinkage, apparent porosity, bulk density, microstructure, compressive strength and thermal conductivity were investigated. The results indicated that mullite-bonded among fibers were formed in the porous fibrous mullite ceramics with a bird nest pore structure. After determining the sintering temperatures and the amount of fibers, the tailored porous fibrous mullite ceramics had a low linear shrinkage (1.36–3.08%), a high apparent porosity (61.1–71.7%), a relatively high compressive strength (4.4–7.6MPa), a low thermal conductivity (0.378–0.467W/m·K) and a narrow range of pore size distribution (around 5μm). The excellent properties will enable the porous ceramics

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