

# Flash sintering of 3 mol% yttria-stabilized zirconia with AC and DC electric fields.

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Experiments on sintering  $\text{ZrO}_2$ : 3 mol%  $\text{Y}_2\text{O}_3$  polycrystalline ceramics (Y-TZP), pressed to cylindrical pellets, were carried out by heating to 1000 °C for application of a DC and AC (1 kHz) electric field (isothermal electric field-assisted sintering) of  $200 \text{ V}\cdot\text{cm}^{-1}$  for 30 seconds, and 2 A as current limit. The experiments were carried out positioning cylindrical specimens inside a vertical dilatometer, with platinum meshes at the parallel surfaces connected with platinum wires to a power supply. Both 3YSZ sintered samples, besides having their apparent densities determined, had their surfaces observed in a scanning electron microscope to evaluate average grain size and distribution of grain sizes. Moreover, impedance spectroscopy analyses were carried out to evaluate the intergranular (mainly grain boundary) and intragranular (bulk) contributions to the electrical resistivity. The results show that besides both samples present similar densities and electrical resistivity, the one submitted to AC electric field-assisted sintering presented smaller grains sizes and a discrete grain size distribution when compared to the one sintered with DC electric field.