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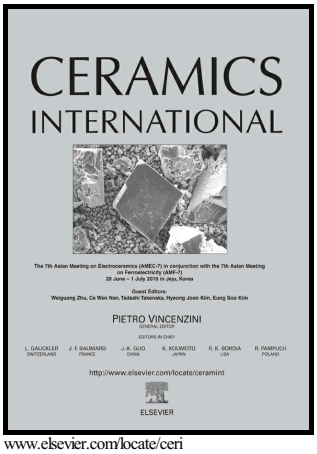

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ACCEPTED MANUSCRIPT

Texturing of hydrothermally synthesized $BaTiO_3$ in a strong magnetic field by slip casting

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Abstract

Barium titanate powder was processed by slip casting in a rotating strong magnetic field of 9.4 tesla. The orientation factor of the sintered compact was analyzed by the X-ray diffraction technique and the microstructure (grain-size) was analyzed by scanning electron microscope. The hydrothermally prepared barium titanate was used as matrix material and the molten-salt synthesized barium titanate, with a larger particle-size, was used as template for the templated grain-growth process. Addition of large template particles was observed to increase the orientation factor of the sintered cast (5 vol% loading). Template particles acted as starting grains for the abnormal grain-growth process and the average grain-size was increased after sintering. Increasing the solid loading (15 vol%) resulted in a similar orientation factor with a decrease of the average grain-size by more than half. However, addition of templates to the 15 vol% cast had a negative effect on the orientation factor. The impingement of growing particles was stated as the primary cause of particle misorientation resulting in a low orientation factor after sintering. Different heating conditions were tested and it was determined that a slow heating rate gave the highest orientation factor, the smallest average grain-size and the highest relative density.

Keywords: A. Slip casting, B. X-ray methods, D. $BaTiO_3$, Magnetic alignment

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