

Fabrication of crystal-oriented barium-bismuth titanate ceramics in high magnetic field and subsequent reaction sintering

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Abstract. High magnetic field was applied to fabricate novel lead-free piezoelectric ceramics with a textured structure. A compact of crystallographically oriented grains was prepared by dry forming in a high magnetic field from a mixed slurry of bismuth titanate and barium titanate powders. Bismuth titanate particles with a size of about 1 μ m were used as the host material. In the forming process, the slurry was poured into a mold and set in a magnetic field of 10 T until completely dried. Bismuth titanate particles were highly oriented in the slurry under the magnetic field. The dried powder compact consisted of highly oriented bismuth titanate particles and randomly oriented barium titanate particles. Barium bismuth titanate ceramics with *a*- and *b*-axis orientations were successfully produced from the dried compact by sintering at temperatures above 1100 °C.

Keywords: magnetic field, lead-free piezoelectric ceramics, sintering, bismuth titanate

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