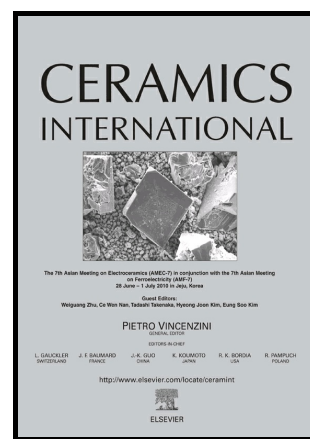


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Effect of MgO addition on the microstructure and dielectric properties of BaTiO₃ ceramics

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Abstract

MgO-doped BaTiO₃ (BaTiO₃/MgO) ceramics were prepared by a solid-state sintering method. The effects of MgO doping on the dielectric properties of BaTiO₃/MgO were investigated in terms of its microstructural development. The BaTiO₃/MgO was characterized by scanning electron microscopy, transmission electron microscopy, Raman spectroscopy, and x-ray powder diffraction. Results show that grain growth of the BaTiO₃/MgO during sintering was inhibited by adding MgO at least 0.5 mole%. It resulted in a high resistance of the BaTiO₃/MgO sintered at high temperature. The BaTiO₃/MgO possessed a broad temperature stability and met Electronic Industries Association (EIA) X7R specification. The improved dielectric properties of the BaTiO₃/MgO are attributed to the decreased tetragonality of BaTiO₃ lattice due to Mg²⁺ substitute for Ti⁴⁺.

Keyword: Sintering; Dielectric properties; BaTiO₃ and titanates; Microstructure-final; Capacitors

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