

Dielectric properties of 1:1 ordered $\text{Pb}(\text{Mg}_{1/3}\text{Ta}_{2/3})\text{O}_3$ ceramics

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Abstract

Thermally induced coarsening of the chemically ordered domains in $\text{Pb}(\text{Mg}_{1/3}\text{Ta}_{2/3})\text{O}_3$ (PMT) ceramics was recently reported to support the “random site” model rather than the “space charge” model for the B-site cation ordering in PMN-related complex perovskite relaxors. However, a systematic comparison of the dielectric behavior of the ordered and disordered material has not yet been reported. In this work, PMT ceramics with different degrees of order were prepared by appropriate heat treatment, and their ordering state was characterized by XRD and TEM observation. The dielectric, and ferroelectric properties of disordered and ordered ceramics are studied as a function of temperature, frequency, and electrical field. It was found that the weak field relaxor nature is insensitive to the chemical order, whereas some non-linear behavior showed an ordering-degree dependence at low temperature range.

Keywords: B. X-ray methods; C. Dielectric properties; C. Ferroelectric properties