

Preparation and characterisation of Nb-PZT(52/48) ceramics

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Abstract

Ceramics with composition of 0.02Nb-0.98PZT(52/48) prepared from powders obtained by hydrothermal synthesis method were investigated. An homogeneous microstructure with grains of 1-3 microns was found and the apparent density of 7.5-7.6g/cm³. Two distinct anomalies well reproducible to various heating/cooling cycles were identified by Differential Scanning Calorimetry investigations: one with a very intense maximum centered at T₁=366.5 Celsius degrees (heat transition of 2.58J/g) and one shoulder at T₂=386 Celsius degrees. The dielectric data show a tendency towards relaxor behaviour with a intense maximum at 390 Celsius degrees/393 Celsius degrees at cooling/heating respectively, for the frequency f=1MHz and a slight anomaly in the range (365-375 Celsius degrees). The two transitions were associated to structural changes in the ceramic: ferroelectric low temperature ordered phase - to - ferroelectric high temperature disordered tilts phase at T₁ and one from ferroelectric high temperature disordered tilts phase - to - paraelectric cubic phase at T₂. The permittivity was analysed with phenomenological models for relaxors.