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Revisiting the phase transitions in $\text{Ba}_x\text{Sr}_{1-x}\text{TiO}_3$ at low doping range ($x \leq 0.1$)J. X. Wang^{1*, 3}, C. Zhang¹, J. -M. Liu^{2*}

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[Abstract] Ba^{2+} substituted SrTiO_3 , $\text{Ba}_x\text{Sr}_{1-x}\text{TiO}_3$ (BST) at low doping range ($x \leq 0.1$) is of particular interest for studying the phase transitions induced by a small amount of polar dopants in the paraelectric matrix SrTiO_3 . We have studied the crystal structure, dielectric and pyroelectric properties of BST ($x \leq 0.1$) in this paper. It is revealed that a few of polar dopants Ba^{2+} in quantum paraelectric matrix SrTiO_3 , not only enhance the phase transitions of SrTiO_3 around 18K and 37K, which are suppressed by the high quantum fluctuations in pure SrTiO_3 , but bring about “local ferroelectric symmetry breaking”. However, no structural transition related to the ferroelectric phase in the BST ($x \leq 0.1$) at macroscopic scale.

Keywords: $\text{Ba}_x\text{Sr}_{1-x}\text{TiO}_3$ solid solution; dielectric property; pyroelectric performance; ferroelectricity.

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