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Strain induced electric field driven relaxor ferroelectricity in $\mathbf{BaZr_xTi_{1-x}O_3}$ system TANMOY MAITI, Lawrence Berkeley National Laboratory, RUYAN GUO, AMAR BHALLA, The University of Texas at San Antonio — A revised complete phase diagram of $Ba(Zr_xTi_{1-x})O_3$ ($0.0 \leq x \leq 1.0$) has been developed based on evaluation of their crystallographic, dielectric, and ferroelectric properties. A new understanding of the relaxor behavior in this system, e.g. associated with the local elastic strains at the nanoscale, has been gained and presented in this paper. Two different kinds of relaxor behaviors are observed in the BZT system; one is dominated by polar Ti-rich regions and another by non-polar Zr-rich regions. BZT relaxor compositions are characterized by measurement of their dielectric (under bias), pyroelectric, and thermal expansion properties in a wide range of temperatures. The structure of the BZT compositions was evaluated by X-ray and neutron diffraction studies. Their local structure has been also probed by micro-Raman spectra. Although the global symmetry of BZT relaxors is cubic from neutron diffraction studies, non-cubic local symmetry is evident based on the micro-Raman spectra of BZT relaxors.

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