Abstract Submitted
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Phase transition of Ta-modified $Pb(Sc_{0.5}Nb_{0.5})O_3$ nanoceramics MARGARITA CORREA, RAM CHOUDHARY, RAM KATIYAR, Department of Physics, University of Puerto Rico, San Juan PR00931-3343 — Ferroelectric relaxors are promising candidates for multilayer ceramic capacitors. We have synthesized nanocrystalline $Pb(Sc_{0.5}Nb_{(1-x)/2}Ta_{x/2})O_3$, ($0.1< x <0.9$) by a high-energy ball milling technique. Analysis of as prepared powders using an X-ray technique shows the formation of materials in the tetragonal phase. TEM micrographs reveal that the particle size decreases to ∼20nm from ∼200nm on increasing the milling time These particles are nanocrystalline as evident by the diffraction rings of the selected area diffraction patterns of the activated powders. Studies of dielectric properties as a function of temperature (200-600K) and frequency (1 kHz – 1 MHz) of the sintered samples at different temperatures have shown that the materials have relaxor ferroelectric behavior and diffuse phase transition for $x \leq 0.5$. However, for $x \geq 0.6$ a diffuse phase transition without the frequency dispersion has been observed. The dielectric/relaxor properties of the compounds are dependent upon the sintering temperature, time, and composition. Detailed results will be presented.

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