Hysteresis and Energy Storage Properties Study of $Ba_{0.5}Co_{0.5}Bi_2Nb_2O_9$ and $Ba_{0.5}Co_{0.5}Bi_2NbTaO_9$ Nano Ferroelectric Ceramics Prepared Through Chemical Route: A Comparative Study

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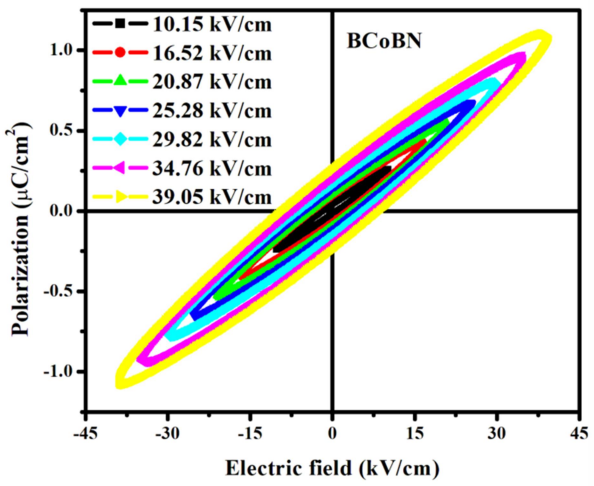

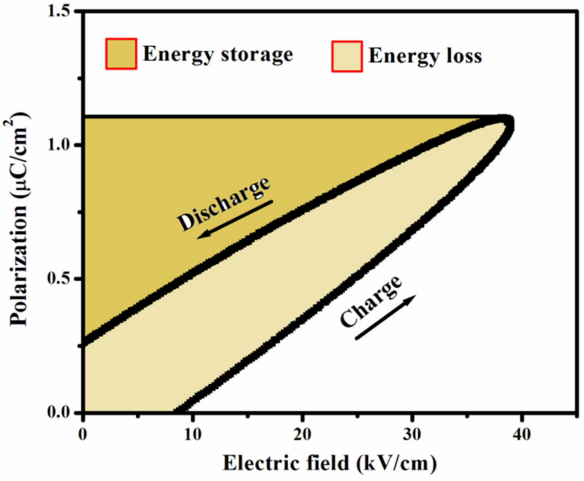

Abstract: $Ba_{0.5}Co_{0.5}Bi_2Nb_2O_9$ (BCoBN) and $Ba_{0.5}Co_{0.5}Bi_2NbTaO_9$ (BCoBNT) ferroelectric nano ceramics were prepared through chemical precursor solution decomposition method. P-E hysteresis study established that both the materials are non-linear ferroelectrics. The coercivity, remnant polarization and saturated polarization values were increased with increasing the applied electric field. BCoBNT showed the highest remnant polarization 3.96 μC/cm^2 at 40.24 kV/cm electric field with a high charge energy storage density of 220.76 J/cm^3. The highest energy efficiency was 84.74 % found for BCoBN ceramics at 10.15 kV/cm applied electric field. BCoBNT showed the much higher polarization than BCoBN ceramics. The discharge and charge energy density were increased with increasing the electric field for both the ceramics. The energy efficiency value was regularly decreased for BCoBNT ceramics but some irregularity was found for BCoBN ceramics.

Keywords: Nanomaterials, Ferroelectricity, FTIR, Hysteresis, Energy storage density