Abstract Submitted
for the SES08 Meeting of
The American Physical Society

Novel Pyroelectric Material Systems for Infrared Sensor Applications PADMAJA GUGGILLA, ASHOK BATRA, MATTHEW EDWARDS, Alabama A&M University — Perovskite structured ceramics have been investigated due to their excellent dielectric, electro-optical, piezoelectric, and pyroelectric properties. Often dopants or additives are used in basic formulations of the materials to enhance or tune the material properties. Lead zirconate titanate (PZT), Cation(s) modified lead zirconate titanate such as lead lanthanum zirconate titanate (PLZT: lanthanum doped PZT), Mn doped lead lanthanum zirconate titanate (STPZT-2) and commercially available modified PZT (BM740) ceramics have been studied for their use in infrared detectors. Oxygen ions with 200 KeV energy and doses of 1.0 $\times$ 10^{16} $ions/cm^2$ are irradiated onto BM 740 and its response is studied in terms of dielectric and pyroelectric properties before and after irradiation. As the pyroelectric materials' figure-of-merit depend upon the element size and the element thermal conductance, pyroelectric materials have also been examined in the form of thick film and thin film. Specified materials' figures-of-merit for their use in infrared detector are calculated and results are compared with several existing candidate materials.

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Date submitted: 18 Aug 2008 Electronic form version 1.4