Functionally Graded Composite Multiferroics and Magnetoelastic Interactions

G. SREENIVASULU, S.K. MANDAL, Oakland University, V.M. PETROV, Novgorod State University, G. SRINIVASAN, Oakland University — This work is on (i) synthesis of functionally stepped or graded ferrite-ferroelectric bilayers and (ii) investigations on the nature of magneto-electric (ME) interactions. The parameters of importance for grading are the piezomagnetic coefficient $q$ and piezoelectric coefficient $d$ that determine the strength of ME coupling. Recent theories predict strong ME interactions in graded systems. Bilayer and trilayers of nickel cobalt ferrite-lead zirconate titanate were studied. Grading of $q$ was accomplished by compositional variation of the ferrite and grading of $d$ was achieved by poling the piezoelectric layers in opposite directions. Studies on low-frequency and resonant ME – coupling reveal strong ME effects in graded systems. – work supported by grants from DARPA and NSF.