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Development of a Room Temperature High Sensitivity Magnetoelectric Scanning Microscope[1] JASON HATTRICK-SIMPERS, LIYANG DAI, ICHIRO TAKEUCHI, MANFRED WUTTIG, Department of Materials Science and Engineering, University of Maryland — In recent years the interest in magnetoelectric (ME) materials has increased dramatically, since they promise to have a number of unique functionalities and capabilities including ultrahigh magnetic field sensitivity. To date there has been little work done to actually use them in applications. We have constructed a high sensitivity room temperature scanning magnetic field microscope using a ME composite device made of a metglass/xyz(PVDF)/metglass sandwitch structured laminate. The smallest ME composite device used was 1 mm x 2 mm x 200 microns. The ME coefficient and the peak voltage of a typical device are 50 mV/Gcm and 3 mV at an AC modulation field of 10 Gauss. Scans of a conducting ring carrying an AC current, with the sensor DC biased at 100 Gauss, will be shown for various ring dimensions and AC currents. Through the variation of AC current we have shown that the sensitivity of the microscope to the z-axis component of AC field is better than 10^{-9} T. We will discuss the relationship between the ME device dimensions and the spatial resolution of the microscope.

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