

Mapping piezoelectric nonlinearity in the Rayleigh regime using band excitation piezoresponse force microscopy

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Abstract: Band excitation piezoresponse force microscopy enables local investigation of the nonlinear piezoelectric behavior of ferroelectric thin films. However, the presence of additional nonlinearity associated with the dynamic resonant response of the tip-surface junction can complicate the study of a material's nonlinearity. Here, the relative importance of the two nonlinearity sources was examined as a function of the excitation function. It was found that in order to minimize the effects of nonlinear tip-surface interactions but achieve good signal to noise level, an optimal excitation function must be used.

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