Detection of Embedded nanostructures by Electrostatic Force Microscopy[1] ZONGHAI HU, YUANZHEN CHEN, MICHAEL FISCHBEIN, ROBIN HAVENER, MARIJA DRNDIC, University of Pennsylvania — Non-destructive imaging of embedded structures with high lateral resolution is of great technological interest. Scanning probe microscopy is generally thought to be sensitive only to surfaces. We report that electrostatic force microscopy (EFM) can be used to study electrostatic inhomogeneities hundreds of nanometers below a uniform sample surface with sub-micron lateral resolution. The sub-surface material can be in liquid phase. Our experimental and simulation results show that the EFM signal depends on many factors such as the distance between the tip and the sample, the depth, dielectric constants, and the carrier density of the embedded inhomogeneities. Potential applications of this technique will also be discussed.

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Date submitted: 30 Nov 2006   Electronic form version 1.4