

MODELING C-AFM MEASUREMENT USING FEM

MARTINEK Jan, ŠLESINGER Radek, KLAPETEK Petr

Czech Metrology Institute, Brno, Czech Republic, EU

Abstract

The presented work describes a finite element method based modeling of a conductive AFM measurement process. The C-AFM is a scanning probe microscopy technique for mapping electrical properties of a sample together with its topography. The contact resistance between the probe and the surface depends not only on electrical characteristics but also on the sample topography. The goal of this work is to identify topography artifacts. The measurement is modeled in two steps - first the problem of mechanical deformation is solved and then the electrical field, and current, is found. The geometry of the model comes from a real sample topography measured using AFM. The whole multiphysics 3D simulation is done for each data point, which makes the problem possible to be solved only using a supercomputer with many simplifications and optimizations.

Keywords: Finite element modeling, conductive AFM, c-afm

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