

Scanning probe microscopy of ion-irradiated materials

Neumann R

*NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION B-
BEAM INTERACTIONS WITH MATERIALS AND ATOMS 151 (1999) 42-55*

The modifications of solids induced by irradiation with energetic ions have been the subject of numerous studies with a large variety of methods, including in particular also microscopy. During the past decade, the techniques of scanning probe microscopy (SPM) opened up a novel access to the characterization of surfaces and interfaces before and after ion-beam exposure. Besides a very high magnification, under favourable conditions reaching even atomic resolution, also changes of properties such as surface topography, friction, and hardness became detectable on a nanometer scale. This report, not aiming to cite the complete literature, intends to give a representative overview of the investigations performed with scanning tunneling and scanning force microscopy on a broad spectrum of materials, including semiconductors, semimetals, ceramics, and polymers. The scientific goals, the solutions offered by SPM as well as the advantages and limits in comparison to other techniques will be addressed. A major aspect is to elucidate that SPM has the task to provide information complementary to the results of the more classical analytical tools.