

Scanning force microscopy in a liquid on single ion tracks: Towards applications in polymers and atomic resolution on crystals

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*NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION B-
BEAM INTERACTIONS WITH MATERIALS AND ATOMS 166-167 (2000) 938-943*

Latent ion tracks are characterised by scanning force microscopy (SFM) in fluids, where the imaging forces can be minimized to extremely small values of order 10^{-10} N and even below. Most importantly, on the surface of polymer foils such as PI and PET, individual ring-shaped (diameter 15-20 nm, apparent height 5-10 nm) latent ion tracks could be revealed. Elasticity artifacts in SFM on a soft sample like a polymer are briefly discussed, clarifying that the true height of these ion tracks may be as small as 2 nm, which explains why they have not been observed yet by SEM. Atomic resolution imaging in water on ionic crystals (calcite) is presented in order to discuss the difficulties when aiming for true atomic resolution on single ion tracks. For instance, ion tracks on calcite can be well detected in air on the nm-scale, but when trying to realize true atomic resolution in water - possible on unirradiated calcite - the tracks begin to etch rapidly.