

Scanning force microscopy corrected for nm-scale sample elasticity on single latent heavy-ion tracks in polymers

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SFM-images of latent tracks of single high-energy (11.4 MeV/n) heavy ions (Au, Bi, Pb) on the surface of polymer foils (PI, PET) reveal 15-20 nm sized ring-shaped delicate structures, only visible when minimizing the imaging forces down to 10^{-10} N or below in a liquid environment. For obtaining here a true 3D topographic map by SFM, the heights are corrected with respect to nm-scale sample elasticity. Quantifying this effect, which on a polymer can cause the measured heights to be artificially increased by a factor up to 2-4 and on a mica substrate still up to a factor of 2, is essential whenever exploiting the SFM's powerful capability of quantifying heights and spring constants on soft samples on a nm lateral scale.