

Measuring and imaging energy dissipation in tapping-mode AFM

N.F. Martínez, R. García

Instituto de Microelectrónica de Madrid, CSIC, 28760 Tres Cantos, Madrid, Spain

rgarcia@imm.cnm.csic.es

Here we study the potential of amplitude modulation AFM usually known as tapping mode AFM to measure inelastic processes¹⁻². A force microscope operated in amplitude modulation AFM may have two different steady states compatible with the same experimental conditions³.

We describe the effect of inelastic tip-surface interactions in the dynamics of the tip and their application to map compositional variations in heterogeneous samples. Energy dissipation reduces the region of coexistence of two stable solutions. Experimental and theoretical studies are performed to illustrate the intimate relationship between energy dissipation and phase shifts in amplitude modulation AFM.

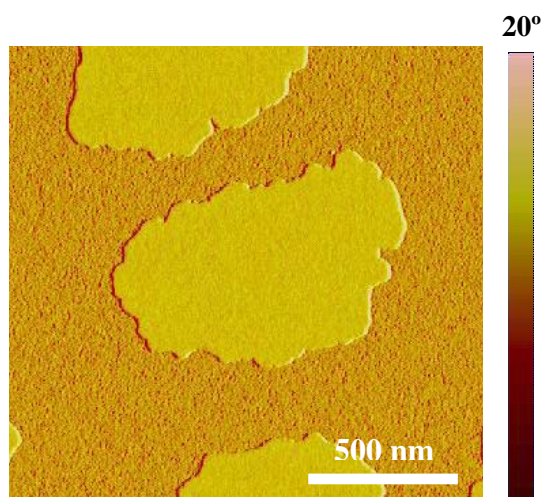


Figure: Phase image of one monolayer of sexithiophene grown on Si substrate

- [1] J. Tamayo and R. Garcia, *Appl. Phys.* **71**, 2394 (1997)
- [2] J.P. Cleveland et al. *Appl. Phys. Lett.* **72**, 2613 (1998)
- [3] R. Garcia, R. Perez, *Surf. Sci. Rep.* **47**, 197 (2002)