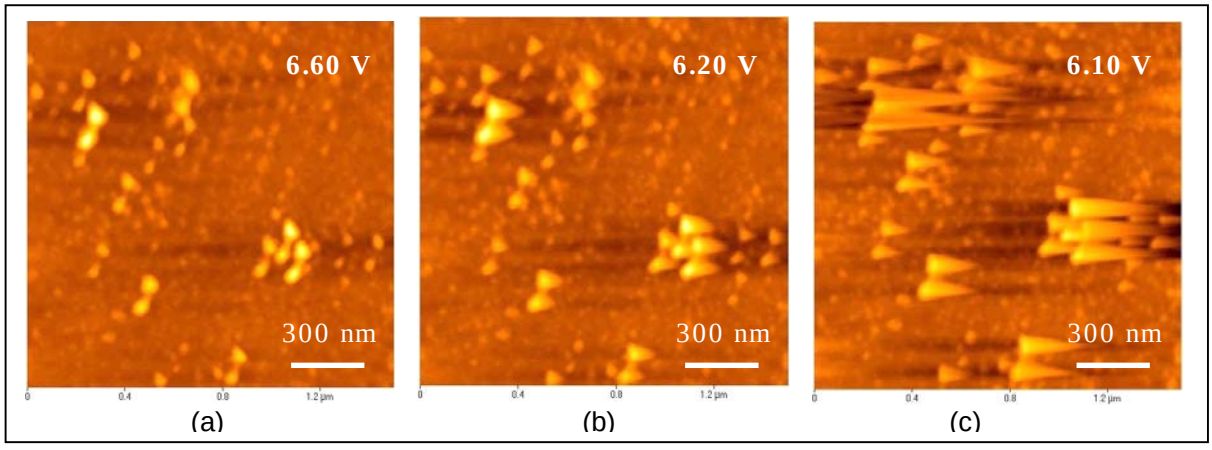
Static AFM Imaging of Bovine Serum Albumin-cocaine conjugated Complex dependent upon the Amplitude Variation

Seong S. Choi, Y.U. Kim[1], V.V. Anh, T. H. Nguyen, D.W. Kim, C.H. Han[2] , M.J. Park[3]
Dept. of Nanoscience, Sun Moon Univ., Ahsan, Chungnam, Korea
[1]Dept. of Biology, Sun Moon University, Ahsan, Chungnam, Korea
[2]Dept. of Chemistry, Sun Moon University, Ahsan, Chungnam, Korea
[3]Dept. of Physics, Korea Military Academy, Seoul, Korea, Korea
mjpark@kma.ac.kr, phykdw@sunmoon.ac.kr, sscphy@empal.com

The fragile surface such as bio-samples can be easily damaged when scanning with contact mode due to strong tip-sample repulsive interactions. Non-contact static AFM provides weaker tip-sample force. In order to enhance the sensitivity of force, small amplitudes of oscillation and small tip-sample distance are generally used. Though operation at distances near to the sample requires fine control force control and free surface contamination. For biomolecule imaging, the intermittent contact mode with larger oscillating amplitude can be exploited. In this report, the BSA(bovine serum albumin)-cocaine conjugated complex sample have been examined dependent upon oscillating amplitude of the cantilever.

The bio-samplee were preparation on the cover glass soaked in acetone and methanol for 15 minutes in an ultrasonic bath for 5 minutes. The silane coupling agent (3-aminoprophyl) diethoxymethylsilane (APDMES, 0.1-1%) was utilized for substrate silanization for 30 min. The BSA-cocaine coupled complex samples was prepared on the cover glass by dropping 10 microliters solution of BSA-cocaine coupled complex samples and being left at room temperature for about 10 minutes to immobilize the bio-samples. The imaging of bio samples have been performed using both noncontact mode and intermittent mode. During both mode operations, the amplitude of the cantilever has been varied in addition to the tip-position variation. With decreasing driving voltage, the amplitude of the cantilever oscillation was decreased and the image became blurred due to instabilities of the tip on the cantilever.



[1] Engel A., Lyubchenko, Mueller D., Trends in *Cell Biol*. 9, 77(1999).
[2] Butt, H-J., Downing, K.J. and Hansma, P.K., Biophys, J. 58, 1473(1990)
[3] F.J. Giessibl, Rev. Mod. Phys., vol 75, 949(2003).