Strategies to investigate biological objects with success using piezoelectric tuning fork Atomic Force Microscopy

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Abstract:

Piezoelectric quartz tuning fork has drawn the attention of many researchers for the development of new Atomic Force Microscope (AFM) self-sensing probes. Indeed, compared to silicon cantilevers used in conventional AFM, the tuning fork do not require the laser optical beam deflection technique which could induced signal artefacts and drift, and could be harmful to the scanned sample in some cases. Moreover, the high stiffness of tuning forks allows the AFM scanning with lower oscillation amplitudes than a cantilever which would offer a better sensitivity as shown by F. J. Giessibl (2001). However, using such self-sensing AFM probe is especially challenging when it concerns biological soft sample. Thus, we will discuss about the strategies to demonstrate the efficacy of this self-sensing AFM probe to perform high resolution imaging and force spectroscopy of biological objects in air and in aqueous media.

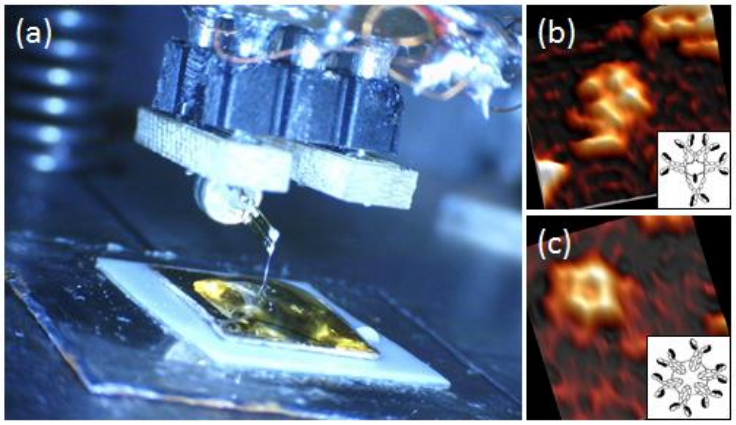

Figure : (a) Close view of a tuning fork AFM probe operating in a buffer droplet. (b) and (c): AFM topography mapping of individual IgM antibodies with respectively pentameric and hexameric structures.

References:

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