

Controlled Immobilization of DNA Molecules Using Chemical Modification of Mica Surfaces for Atomic Force Microscopy

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We have developed two techniques of controlling adsorption of DNA molecules on mica surfaces for atomic force microscopy (AFM) imaging. The first technique is the use of a mica surface modified with diluted 3-aminopropyltriethoxysilane (APS). Here we named this a "diluted APS-treated mica (AP-mica)" technique. The second technique is the use of a mica surface modified with mixed self-assembled monolayers (SAM) of organosilanes. In both of the techniques, the number of DNA molecules immobilized on a mica surface was controlled. Further, a conformational change of circular DNA, from a supercoiled to a relaxed form was observed for the molecules immobilized on a "diluted AP-mica" surface, when 254-nm UV light was irradiated. This observation demonstrated that flexibility of circular DNA molecules was kept on a "diluted AP-mica" surface.