Application of AFM Anodic Oxidation to Patterning of Biomolecules on Si

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The micropatterning of biomolecules on solid surfaces is becoming more and more important for the development of miniaturized and integrated biosensors. In this study, atomic force microscopy (AFM) was applied to the micropatterning of biomolecules on a Si surface. In this method, oxide patterns are drawn on the surface with the AFM probe by the anodic oxidation technique, and then, those oxide patterns are used as templates for the immobilization of biomolecules such as protein and DNA with the help of linker molecules. Protocols for both negative and positive patterning processes were developed. A line pattern of protein molecules as narrow as 50 nm was successfully fabricated. It was also possible to obtain “DNA wires” that connect oxide dots on the surface.

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