

Artificial DNA Patterns by Mechanical Nanomanipulation

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A special method, which is a combination of macroscopic "modified molecular combing" and microscopic "molecular cutting", is proposed in this paper. DNA strands are first aligned on a solid substrate to form a matrix of 2D networks. Atomic force microscopy is then used to cut the DNA network in order to fabricate fairly complex artificial patterns. Curved and wavy structures are constituted by a manipulation process based on the elastic behavior of DNA strands. A new phenomenon of physical "folding" of DNA induced by the AFM probe has been found. DNA strands can be converted into spherical nanoparticles and nanorods by the special process of "pushing" during which DNA molecules fold up into ordered structures in air.