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The Application of Supramolecular Nanostamping (SuNS) to the Replication of DNA Nanoarrays OZGE AKBULUT, MIT, J. JIN-MI, KAIST, RYAN D. BENNETT, YING HU, MIT, HEE-TAE JUNG, KAIST, ROBERT E. COHEN, ANNE M. MAYES, FRANCESCO STELLACCI, MIT — The present spot size for DNA microarrays is on the order of micrometers. However, there is a need for smaller arrays to allow the detection of smaller volumes of analytes. Although, SPM-based techniques are capable of fabricating nanoscale bio-arrays, such fabrication methods are serial in nature and consequently slow and expensive. A recently introduced method, Supramolecular Nanostamping (SuNS) can overcome this problem by replicating DNA microarrays. In SuNS, a master (i.e. a DNA microarray made of DNA features immobilized onto a surface) is hybridized with its complementary DNA molecules terminated with 'sticky' end groups. A secondary surface is then placed onto the hybridized master to allow for bond formation with the 'sticky ends' of the complementary DNA. Afterwards, the master and the secondary surface are separated using heat or mechanical forces effectively achieving a replica of the original DNA array. Here, we demonstrate the application of SuNS to DNA nanoarrays proving that SuNS can reproduce DNA arrays with features as small as 14 $\pm$ 2 nm spaced 77 $\pm$ 10 nm. Moreover, we show that hybridization of these nanoarrays can be detected using AFM in a simple and scaleable way that does not require labeling of the DNA strands.

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