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Controlled Growth of Nano- and Bio-Arrays on Patterned Substrates

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Abstract- Bio- and nano-material arrays have attracted significant attention due to their importance in a number of research and application fields, such as biology, sensors, devices, etc. How to generate these arrays in a controlled manner is critical. In this talk, we introduce several methods developed in our group to show how to control the growth of bio- and nanoarrays on patterned solid substrates. By using dip-pen nanolithography (DPN) [1], the polyamidoamine (PAMAM) dendrimers were patterned on solid substrates, which were successfully used as templates for controlled growth of peptide nanoarrays [2]. The Co nanoparticle patterns, generated on solid substrates by DPN, were used as catalyst for controlled growth of single-walled carbon nanotube (SWCNT) arrays [3]. In order to increase the throughput of the generated patterns and save the patterning time, although the multi-pen DPN [4a,b] and polymer-pen lithography [4c] can be used, recently we developed a facile “needle-scratching” method (NSM) to generate large-area catalyst patterns on solid substrates at nearly no cost, which were successfully used for growth of densely aligned SWCNT arrays [5]. We believe that this simple method could open up an avenue for fast, cheap and large-area fabrication of CNT-based nanodevices.

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