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**Directed assembly of one-dimensional functional nanostructures**

ERIKA PENZO, MATTEO PALMA, RISHENG WANG, SHALOM J. WIND, Columbia University — One-dimensional (1D) nanostructures have unique electronic, optical and mechanical properties that have attracted intense interest over the past two decades. Single wall carbon nanotubes (SWNTs) and semiconducting nanorods have long been recognized as potential candidates for future nanoelectronic applications. The small size and the fact that these nanostructures are synthesized either at high temperatures or in solution make it difficult to organize them in complex architectures, a key requirement for their exploitation. As a step toward this goal, we are developing approaches leading to the controlled and ordered arrangement of nanoobjects on lithographically patterned, chemically (or biochemically) functionalized surfaces. One approach consists in patterning metallic nanodots that serve as anchors by selective functionalization with single stranded DNA (ssDNA) or with other chemical moieties. End functionalized nanostructures are attached to the dots through DNA hybridization or through a covalent bond. A second approach consists in patterning hydrophilic regions on hydrophobic substrates. Ion-complexed nanostructures selectively bind to the hydrophilic pattern.

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