Abstract: A key challenge in nanotechnology is the design, manufacture, and integrate nanomaterials and nanodevices. Self-assembled nanomaterials are believed to be critical in our search of sustainable fabrication and new materials. Towards this end, DNA nanotechnology has attracted significant attentions due to its programmability and its precise control of matter at nanoscale. By combining DNA self-assembly with functional molecules and materials, we can create a rich repository of hybrid nanomaterials and nanomachines. For instance, these DNA nanostructures can be formed and integrated with metals and semiconductors, with a true spatial three-dimensional resolution of a few nanometers, far exceeding conventional lithographic approaches.

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