The construction of designed nanoscale arrangements of materials remains a challenge. To address this key issue we are utilizing scaffolded DNA origami as a platform for placing various materials with sub-10-nm precision. Additionally, we have developed electrochemical methods to form continuous, electrically conductive nanowires with these DNA-assembled materials. We have electrolessly plated both metal nanorod and metal nanoparticle seeds placed on DNA origami to form nanowires and have measured their electrical conductance. We are also utilizing DNA origami as nanometer-precision scaffolding for the placement of nanomaterials. Because we can readily control the spacing between particles, this platform allows systematic studies for optimization of plating to form nanowires. Moreover, we have designed and made three-dimensional DNA origami assemblies and are evaluating their controlled surface localization on nanoparticles. These DNA nanostructures show great promise for the organization of materials with nanometer-level precision and for the creation of conductive nanowires.

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