Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Visualizing DNA Nanoparticle Motion under Graphene Liquid Cell TEM QIAN CHEN, Department of Chemistry and Miller Institute for Basic Research in Science, University of California, Berkeley, JESSICA SMITH, JUNG-WON PARK, SOMIN LEE, Department of Chemistry, University of California, Berkeley, ALEX ZETTL, Department of Physics, University of California, Berkeley, PAUL ALIVISATOS, Department of Chemistry, University of California, Berkeley; Materials Sciences Division, Lawrence Berkeley National Laboratory — We think of a simple colloidal nanocrystal as one type of artificial atoms. They mutually interact, cluster into artificial molecules, and further arrange into macroscopically functional artificial solids. The "atomic" resolution dynamics of this bottom-up strategy in materials design is studied here in a system of artificial molecules composed of DNA and nanoparticle. The observation of dynamics in their liquid environment is recently enabled by graphene liquid cell transmission electron microscopy (TEM). In comparison to conventional TEM, wherein the assembled 3D artificial structures are dried out during sample preparation and thus are collapsed, this graphene liquid cell introduces a special local liquid structure that retains the conformations as well as the dynamics of the assemblies. In situ imaging of correlated motions of DNA and nanoparticle provides insights into the design principles of artificial nanocrystal molecules and solids linked by DNA.

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Date submitted: 27 Nov 2012 Electronic form version 1.4