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Phase Behavior and Magnetic Response of DNA-mediated Gold and Iron Oxide Nanoparticle Assemblies[1] YUGANG ZHANG, FANG LU, KEVIN G. YAGER, Center for Functional Nanomaterials, Brookhaven National Laboratory, DANIEL VAN DER LELIE, Center for Agricultural and Environmental Biotechnology, Research Triangle Institute International, OLEG GANG, Center for Functional Nanomaterials, Brookhaven National Laboratory — Gold nanoparticles (NPs) have long been long served as model systems to study phase behavior of DNA-assisted NP assemblies. Incorporation of different types of nano-objects into DNA-NP systems opens attractive possibilities for the material design. Furthermore, it also allows enriching a self-assembly behavior by an introduction of non-specific yet controllable interparticle interactions. Herein, we report the DNA-mediated assembly of a heterogeneous system comprising gold and superparamagnetic iron oxide (IO) NPs. We systematically studied the phase diagram of the assembled systems by varying a system's composition, DNA design and environmental conditions. Our studies show that by controlling a balance between non-specific and DNA-recognition interactions via system design the assembled phase can be switched between a face-centered cubic (fcc) structure of a IO assembly and a superlattice formed by Au-IO core-shells clusters. We also observed that structure of assemblies is responsive to the magnetic field.

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[X] Prefer Oral Session
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