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Self Assembly of Tethered Nanoparticle Telechelics RYAN MARSON, Materials Science and Engineering, University of Michigan, CAROLYN PHILLIPS, Applied Physics, University of Michigan, JOSHUA ANDERSON, SHARON GLOTZER, Chemical Engineering, University of Michigan — Simulations, theory, and experiement predict that aggregating nanoparticles functionalized with polymer tethers can self-assemble to form phases seen in block copolymer and surfactant systems, but with additional nanoparticle ordering and mesophase complexity. Here we consider a novel class of "telechelic" tethered nanoparticle building blocks, where two nanoparticles are connected together by a polymer tether. The architecture is similar to a triblock copolymer, but with additional geometric constraints imposed by the rigid particle end groups. Using Brownian dynamics simulations, we explore the phase diagrams of several examples of this class of nano-building-block, and present predictions of novel phases and their dependence on particle size, tether length, and thermodynamic parameters. We compare our results with recent simulations of di-tethered nanospheres [1, 2] and mono-tethered nanospheres [2, 3].

1. Iacovella, C. R.; Glotzer, S. C.; *Soft Matter* **2009**, 5, 4492-4498.

2. Iacovella, C. R.; Keys, A.S..; Glotzer, S. C. *PNAS*, in press. arXiv:1102.5589.

3. Phillips, C. L.; Iacovella, C. R.; Glotzer, S. C.; *Soft Matter* **2010**, 6, 1693-1703.

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