Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Self-assembly of coiled coil peptides into nanoparticles vs 2-d plates: effects of assembly pathway KYUNGHEE KIM, DARRIN POCHAN, Univ of Delaware — Molecular solution assembly, or self-assembly, is a process by which ordered nanostructures or patterns are formed by non-covalent interactions during assembly. Biomimicry, the use of bioinspired molecules or biologically relevant materials, is an important area of self-assembly research with peptides serving a critical role as molecular tools. The morphology of peptide assemblies can be controlled by adjusting solution conditions such as the concentration of peptides, the temperature, and pH. Herein, spherical nanostructures, which have potential for creating an encapsulation system, are formed by self-assembly when coiled coil peptides are combined in solution. These peptides are homotrimeric and heterodimeric coiled-coil bundles and the homotrimer is connected with each of heterodimer through their external surfaces via disulfide bonds. The resultant covalent constructs could co-assemble into complementary trimeric hubs, respectively. The two peptide constructs are directly mixed and assembled in solution in order to produce either spherical particles or 2-d plates depending on the solution conditions and kinetic pathway of assembly. In particular, structural changes of the self-assembled peptides are explored by control of the thermal history of the assembly solution.

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Date submitted: 11 Nov 2016 Electronic form version 1.4