



~~~~ Polymer Physics Seminar ~~~~

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301 Steidle Bldg.

Self-assembly of Doublets made from Flattened Spherical Polymer Colloids

Novel bottom-up fabrication methods are explored for the self-assembly of strong yet flexible colloidal chains, no external field is applied. High ionic strength greatly reduces electrostatic repulsions, promoting colloidal aggregation due to van der Waals attractive forces. If part of a spherical particle is flattened, the effective interaction area with another flat region on a particle is increased relative to sphere-sphere interactions. The flat region on one particle will preferentially “bond” to a flat region on another particle, almost like having two circular plates interacting. This flat-flat orientation strengthens the local interaction forces by up to 100x because the interaction area has been maximized. Not only can flat-region bonds be quite strong, but they are freely rotatable and flexible, with no energy barriers for rotation because particles reside in a deep secondary energy minimum. The simplest chain to study is a doublet. In this talk, I will discuss the interparticle force modeling and experiments showing how we flatten particles and form flat-flat doublets.