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Guiding 3-D Self Assembly of Nanostructures by DNA Hybridization PHILLIP ROGERS, CARL BAUER, STEPHEN VANDERET, DANIEL HANSEN, ANTOINE CALVEZ, JACKSON CREWS, ALISTAIR WOOD, KHODADAD DINYARI, Cal Poly Physics Department, BRAD ROBERTS, JAMES LAU, Cal Poly Materials Department, DAVID PINE, UCSB Chemical Engineering and Materials Departments, ERIC MICHEL, UCSB Chemical Engineering Department, PETER SCHWARTZ, Cal Poly Physics Department, CAL POLY PHYSICS DEPARTMENT TEAM, CAL POLY MATERIALS DEPARTMENT TEAM, UCSB CHEMICAL ENGINEERING DEPARTMENT TEAM, UCSB MATERIALS DEPARTMENT TEAM — The directed three dimensional self-assembly of microstructures and nanostructures through the selective hybridization of DNA is the focus of great interest toward the fabrication of new materials. Single stranded DNA is covalently attached to polystyrene latex microspheres and functions as a "smart Velcro" by only bonding to another strand of DNA of complementary sequence. The attached DNA increases the charge stabilization of the microspheres and allows controllable aggregation of microspheres by hybridization of complementary DNA sequences. The process is perfectly selective and reversible by heating, with a characteristic "aggregate dissociation temperature" that is dependent on salt concentration, and the evolution of aggregate dissociation with temperature is observed with optical microscopy.

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