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**Specific and Reversible Assembly of DNA Coated Colloids** REMI DREYFUS, IRMGAARD BISCHOFBERGER, Physics, NYU, RUOJIE SHA, Chemistry, NYU, ANTHONY KIM, JOHN CROCKER, Bio Chem Eng, U Penn, NADRIAN SEEMAN, DAVID PINE, PAUL CHAIKIN, Physics, NYU — We aim to create a new class of materials that self-assemble and self-replicate. Biotin-terminated DNA strands are attached to neutravidin coated polystyrene particles via the well established avidin-biotin coupling mechanism. The DNA is composed of a 61-base strand and a 50-base complementary strand, leaving a single sticky end of 11 bases to interact with its complement attached to another particle. Complementary particles mixed together aggregate into fractal structures. Increasing the temperature leads to dehybridization of the DNA strands and disaggregation of the particles. A typical cycle of aggregation, disaggregation, and reaggregation, as investigated by videomicroscopy, takes $\sim$ 20 minutes and has been repeated more than a dozen times. Our melting curves are sharp and show a strong dependence with buffer concentration. In a highly ionic environment, the aggregation is well described by a diffusion limited process and slows down considerably as the aggregation temperature approaches the melting temperature. We show how these materials are promising for creating new self-replicating structures.

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