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Kinetics of the Association of DNA Coated Colloids KUN-TA WU, LANG FENG, Center for Soft Matter Research, New York University, RUOJIE SHA, Chemistry Department, New York University, REMI DREYFUS, Complex Assemblies of Soft Matter, CNRS-Rhodia-UPenn UMI 3254, ALEXANDER GROSBERG, Center for Soft Matter Research, New York University, NADRIAN SEEMAN, Chemistry Department, New York University, PAUL CHAIKIN, Center for Soft Matter Research, New York University, CENTER FOR SOFT MATTER RESEARCH, NEW YORK UNIVERSITY TEAM, CHEM-ISTRY DEPARTMENT, NEW YORK UNIVERSITY COLLABO-RATION, COMPLEX ASSEMBLIES OF SOFT MATTER, CNRS-RHODIA-UPENN UMI 3254 COLLABORATION — The self-assembly of DNA coated colloidal particles opens a door to complex colloidal architecture. To understand how particles aggregate due to DNA hybridization between particles is the key to program colloidal aggregation. In this study, we investigate theoretically and experimentally the aggregation time of micron scale particles as a function of DNA coverage and the ion concentration I. Our particles coated with streptavidin can attach \sim 70,000 biotinlated DNA molecules, which have a double strand with 49 base pairs and an 11 base sticky end. At I = 60 mM, particles 100% fully covered with DNA show an aggregation time of $\tau = 6$ minutes. For 10% DNA covered particles at I = 35 mM, $\tau = 57$ hours. A simple model based on the reaction limited aggregation and electrical repulsion for DNA hybridization is developed and tested. These ex-periments and the model also allow us to use the microscopic colloidal Kun-Ta Wu Center for Soft Matter Research, New York University aggregation to measure nanoscopic hybridization rates.

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