Supporting Information

Towards reversible bioresponsive aptamer-based nanocomposites: ATP binding and removal from DNA-grafted silica nanoparticles.

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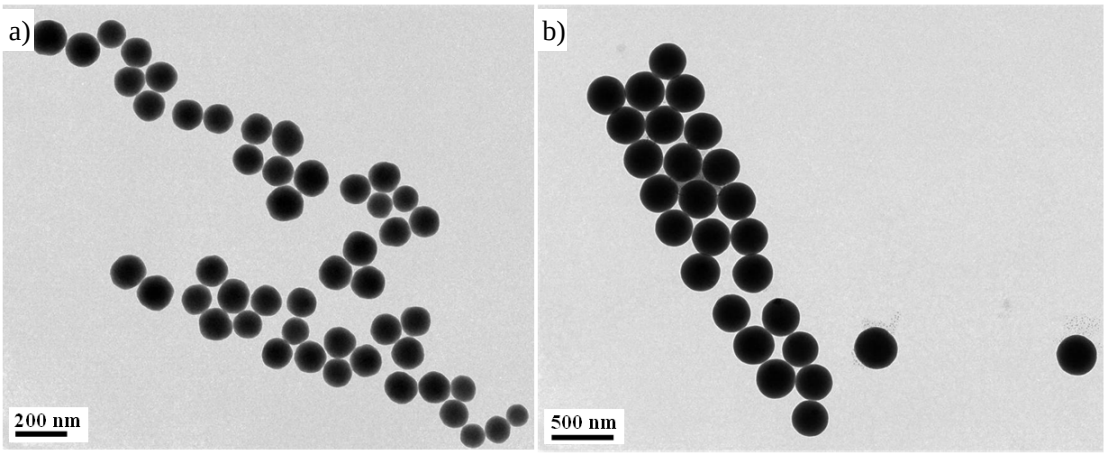

Figure S1. TEM micrographs of (a) 120-SiNP and (b) 290-SiNP.

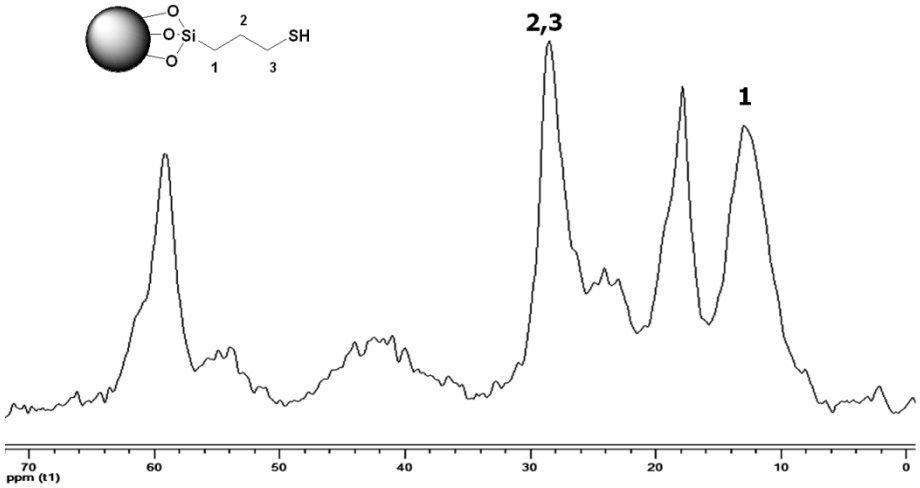

Figure S2. ^{13}C solid state NMR of 120-SiNP-SH. The two peaks appearing at 17.5 and 58.9 ppm are assigned to unhydrolyzed ethoxy groups in the hybrid SiO_2 matrix. The peak at 27.7 ppm is assigned to methylene C atoms 2 and 3, and the peak at 11.6 ppm is due to methylene C atom 1 of attached MPTMS.

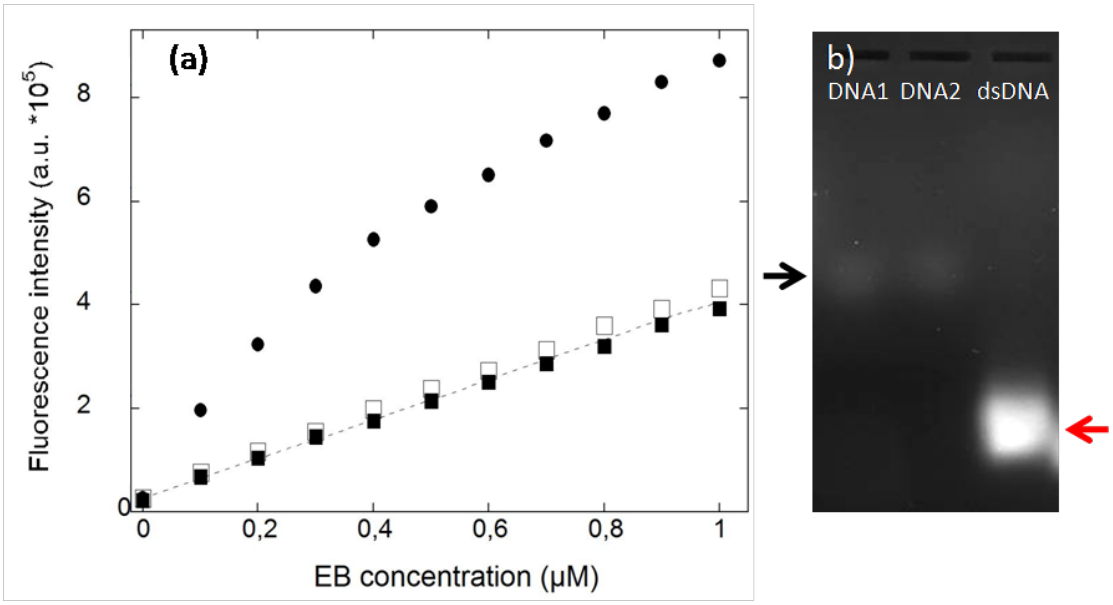

Figure S3. Characterization of ssDNA1, ssDNA2, and the resulting dsDNA1-2. (a) Fluorescence spectroscopy: (■) ssDNA1, (□) ssDNA2, and (●) dsDNA1-2. Fluorescence of EB alone is given as reference (dashed line). (b) Gel electrophoresis. [dsDNA] = 100 nM, [EB] = 1μM.

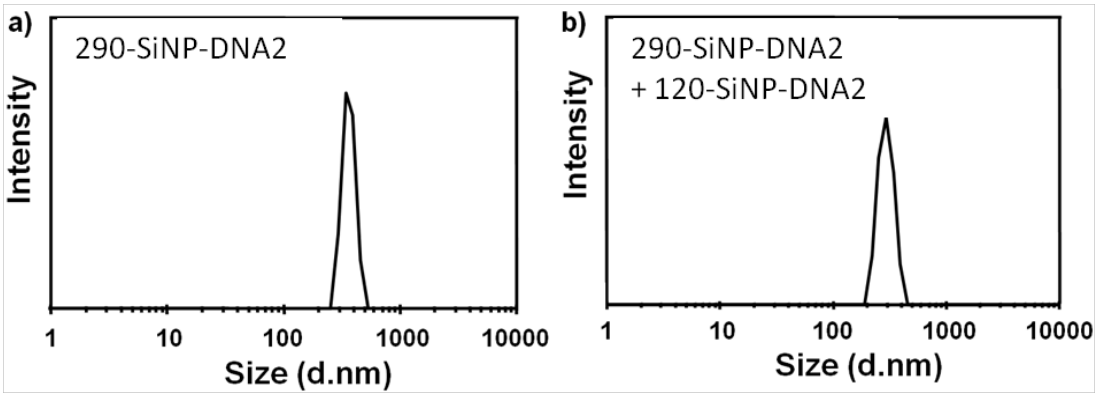

Figure S4. DLS control experiment for NP interactions: 5 nM DNA (*for 290-SiNP-DNA2*), 25 nM DNA (*for 120-SiNP-DNA2*) in Tris buffer, pH 8.3.

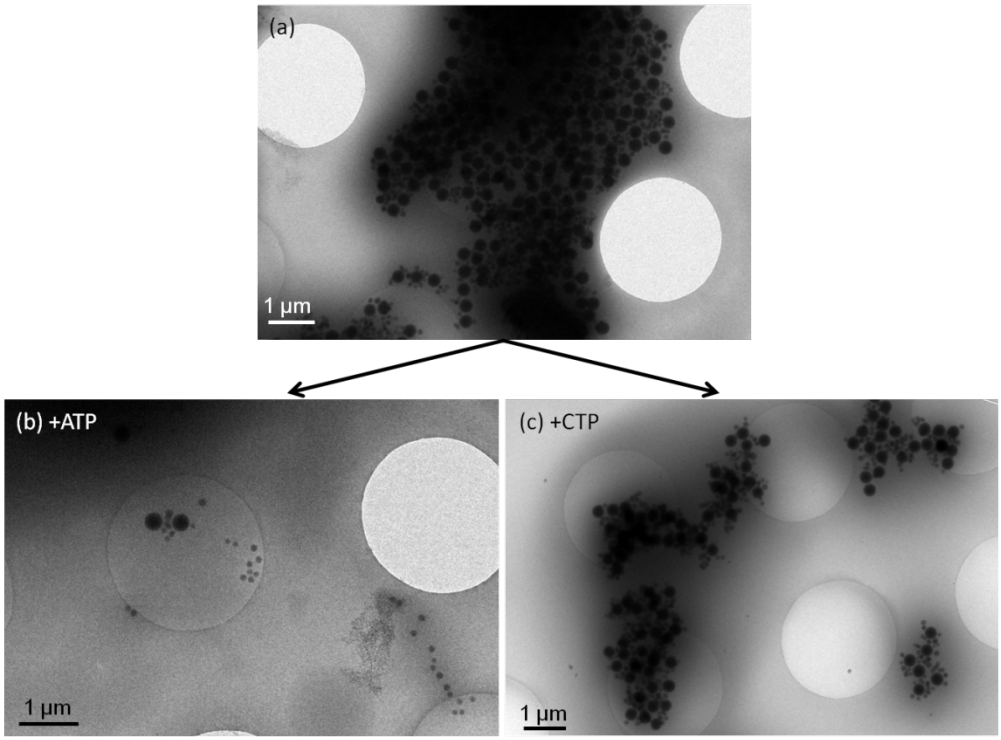

Figure S5. Cryo-TEM of SiNP-DNA networks (a) in absence of target, and after addition of (b) ATP, and (c) CTP. [DNA] = 25 nM, [ATP] = [CTP] = 0.5 mM.

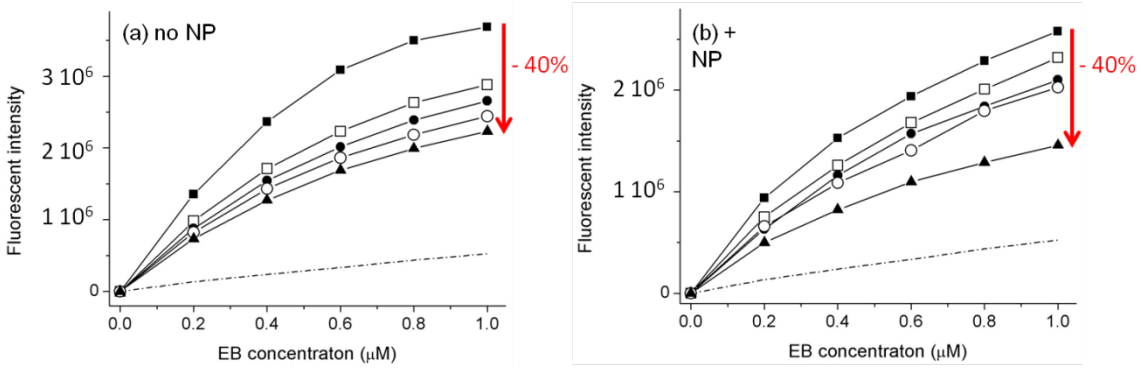

Figure S6. Characterization of the dilution of the system during the dialysis process in absence of ATP: (a) in absence and (b) presence of SiNPs. Fluorescence intensity at 650 nm before dialysis (■), and after 1 day (□), 2 days (●), 3 days (○), and 4 days dialysis (▲). [dsDNA] = 100 nM, [EB] = 1µM. Fluorescence of EB alone, is given as reference (dashed-dotted line).

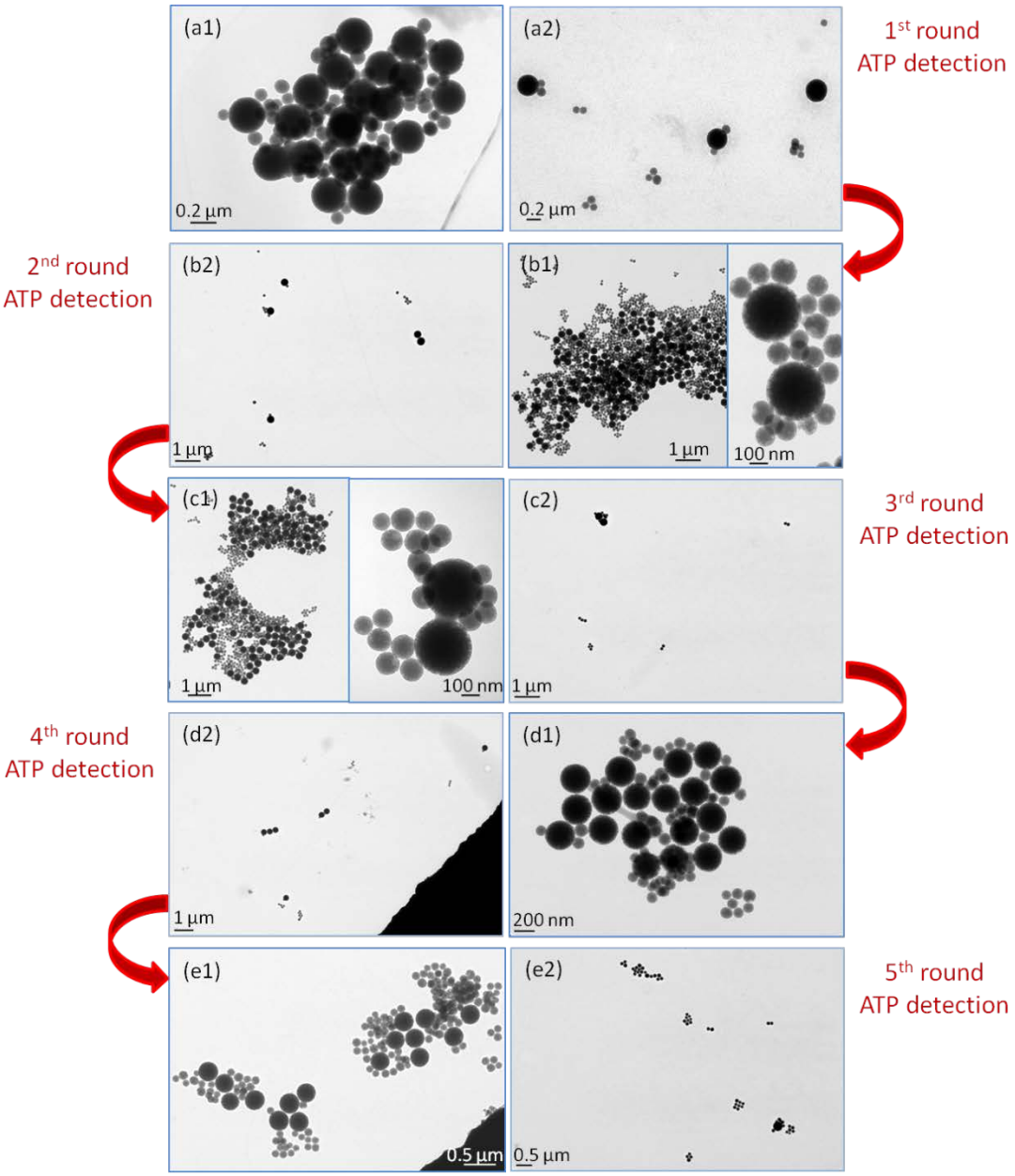

Figure S7 TEM of (a1, b1,c1, d1, e1) re-assembly of networks after dialysis, and (a2, b2,c2, d2, e2) their disassembly upon ATP addition (5 mM), over 5 rounds of ATP detection.