ARTICLE

# Versatile Route to Core-Shell Reinforced Network Nanostructures

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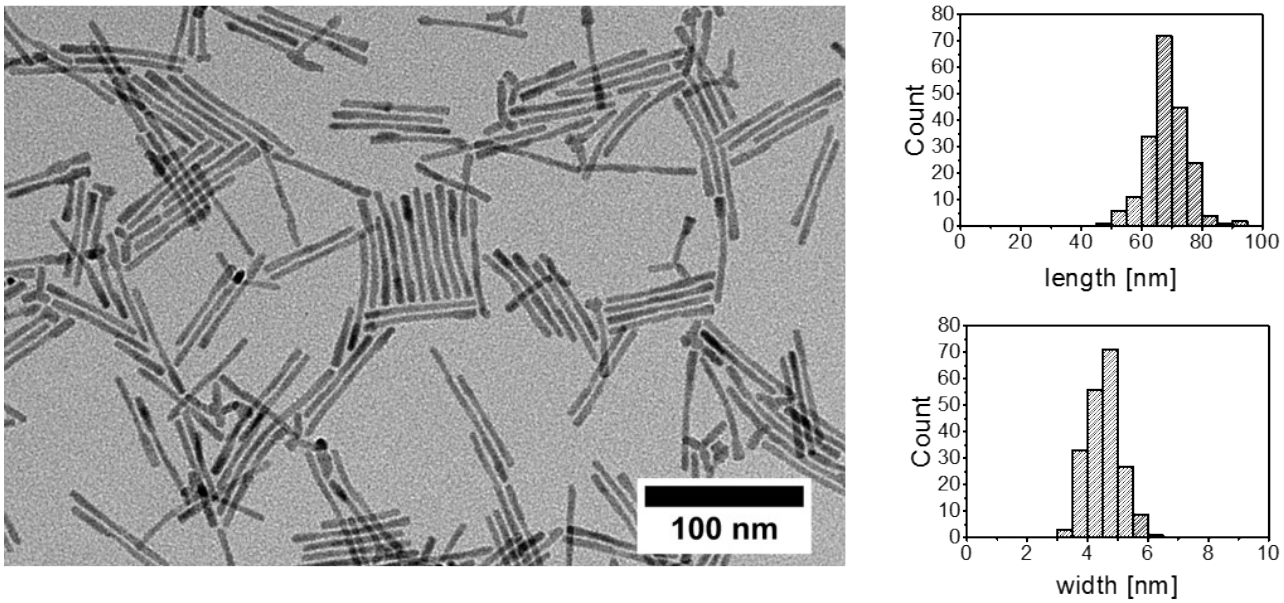


Figure S1. TEM micrograph and size distribution (measured for 200 particles) of CdSe/CdS nanorods used for production of networks.

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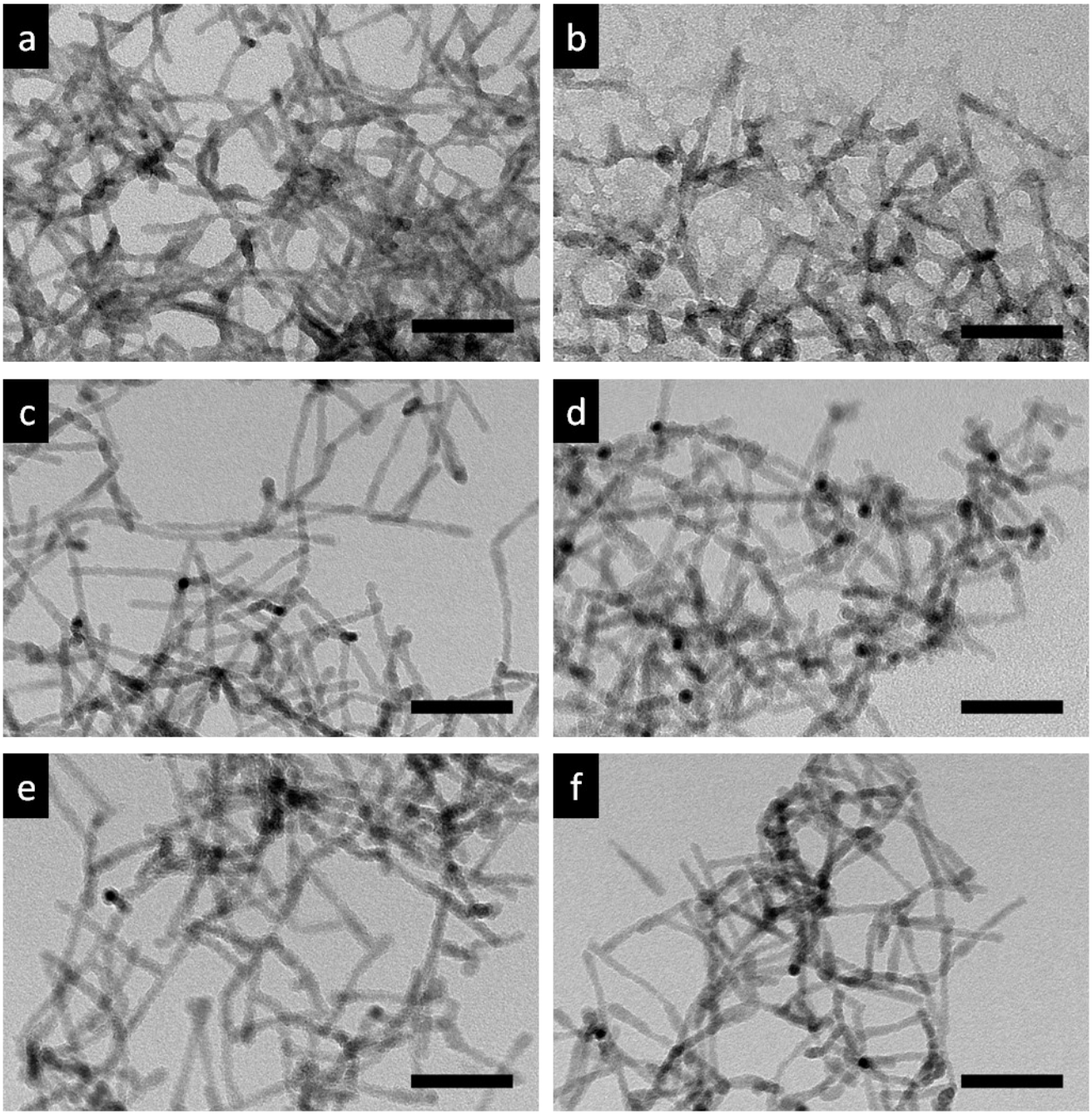


Figure S2. TEM micrographs of silica modified CdSe/CdS nanorod networks with increasing amount of water added for hydrolysis of TEOS, (a) neither water nor ammonia added, (b) no water added, (c) 45 µL, (d) 90 µL, (e) 360 µL, (f) 900 µL water added, scale bars correspond to 50 nm.

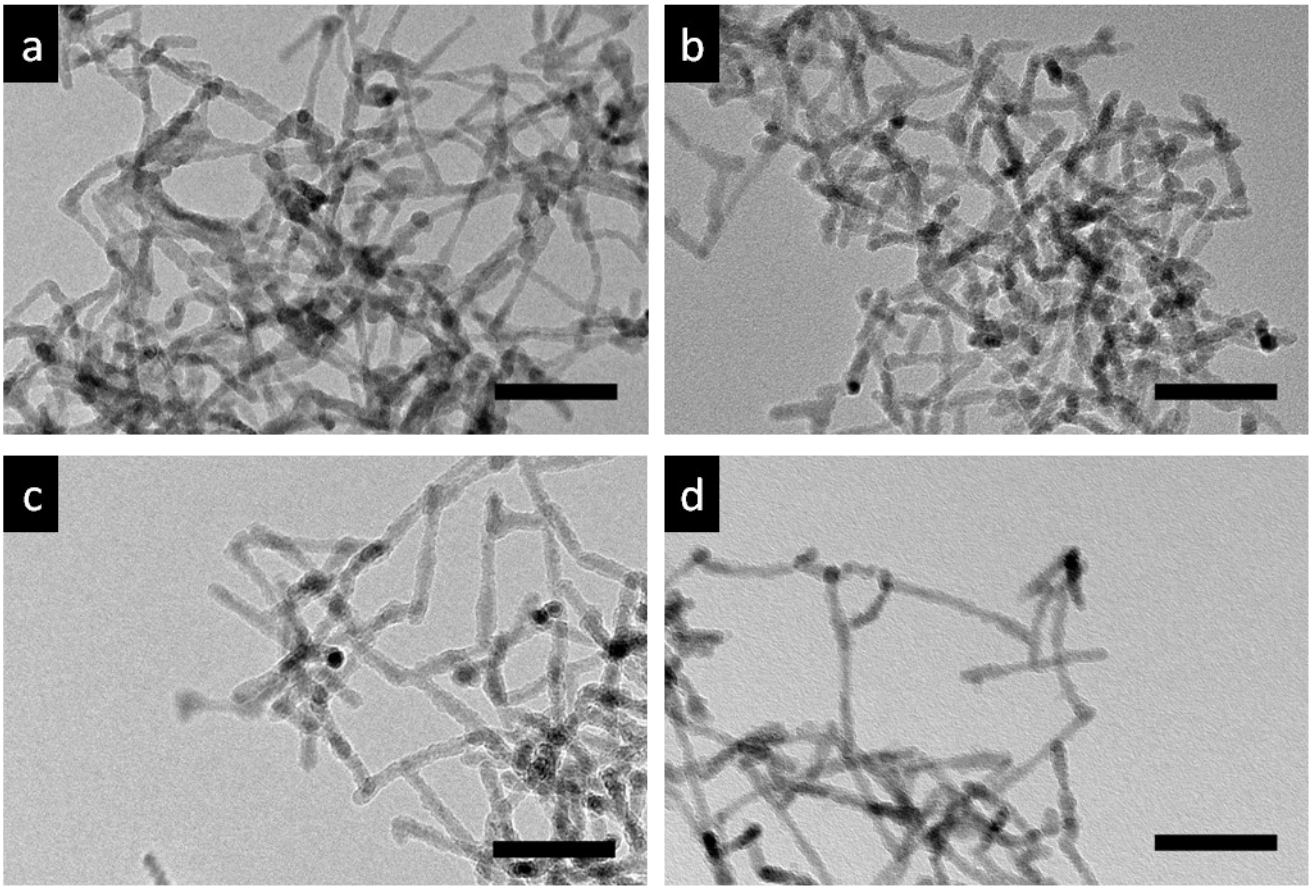


Figure S3. TEM micrographs of silica modified CdSe/CdS nanorod networks with increasing amount of ammonia added for hydrolysis of TEOS, (a) no $NH_3$ added, (b) 1 µL, (c) 5 µL, (d) 20 µL, scale bars correspond to 50 nm.

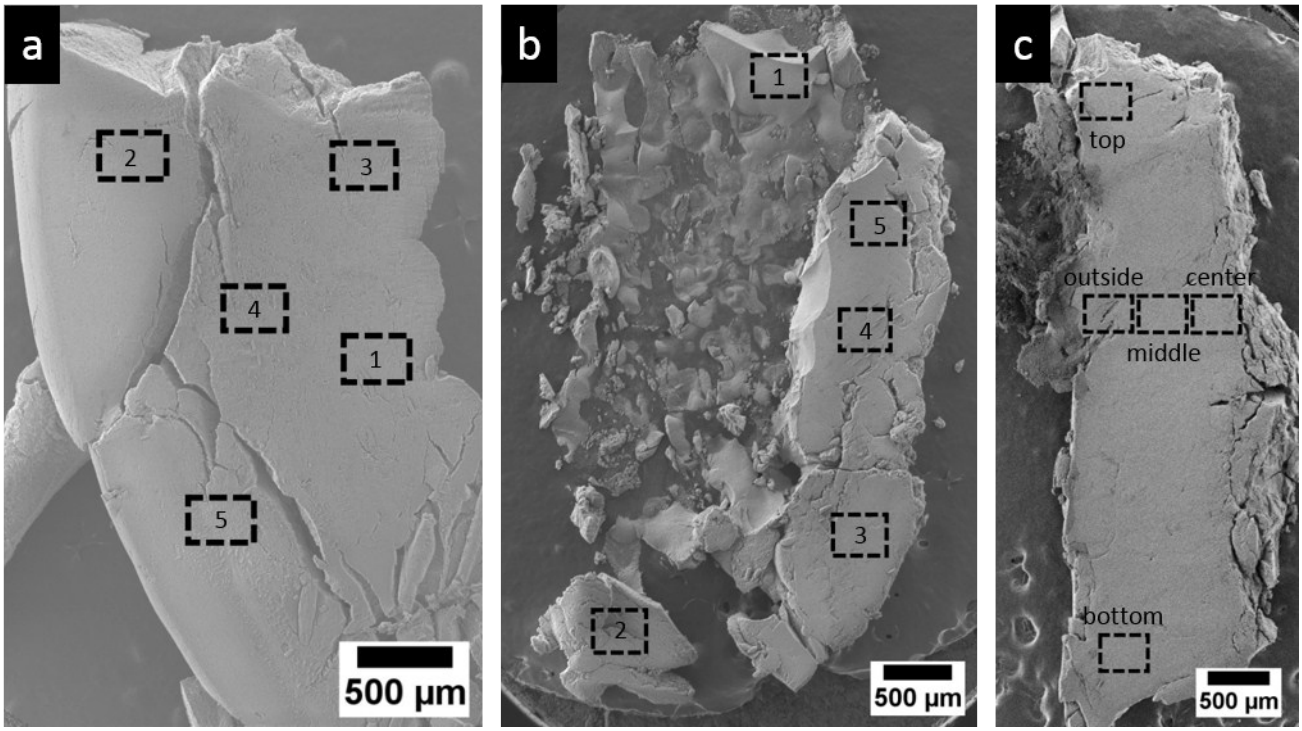


Figure S4. Overview SEM micrographs of samples with measurement positions for elemental distribution by EDX for different ratios of Si/Cd, (a) no TEOS added, (b) 1/1, and (c) 2/1. Pictures are assembled from two single measurements each.

The elemental analysis (Figure S5) shows minor amounts of silicon in an unmodified network where no TEOS was added with a measured Si/Cd-ratio of 0.05/1. As these are minimal amounts, various sources of silica could be responsible for the minor contaminations during preparation and modification of the networks as the synthesis and modification takes place under basic conditions potentially leading to Si-Ions getting dissolved and dispersed inside the sample. If TEOS is actually added to the gel the Si/Cd-ratio found by EDX is indeed much higher. In case of an initial 1/1 ratio the measured ratio at random points (see Figure S4) scattered over the network structure (Figure S5) varies between 0.5 and 1.4.

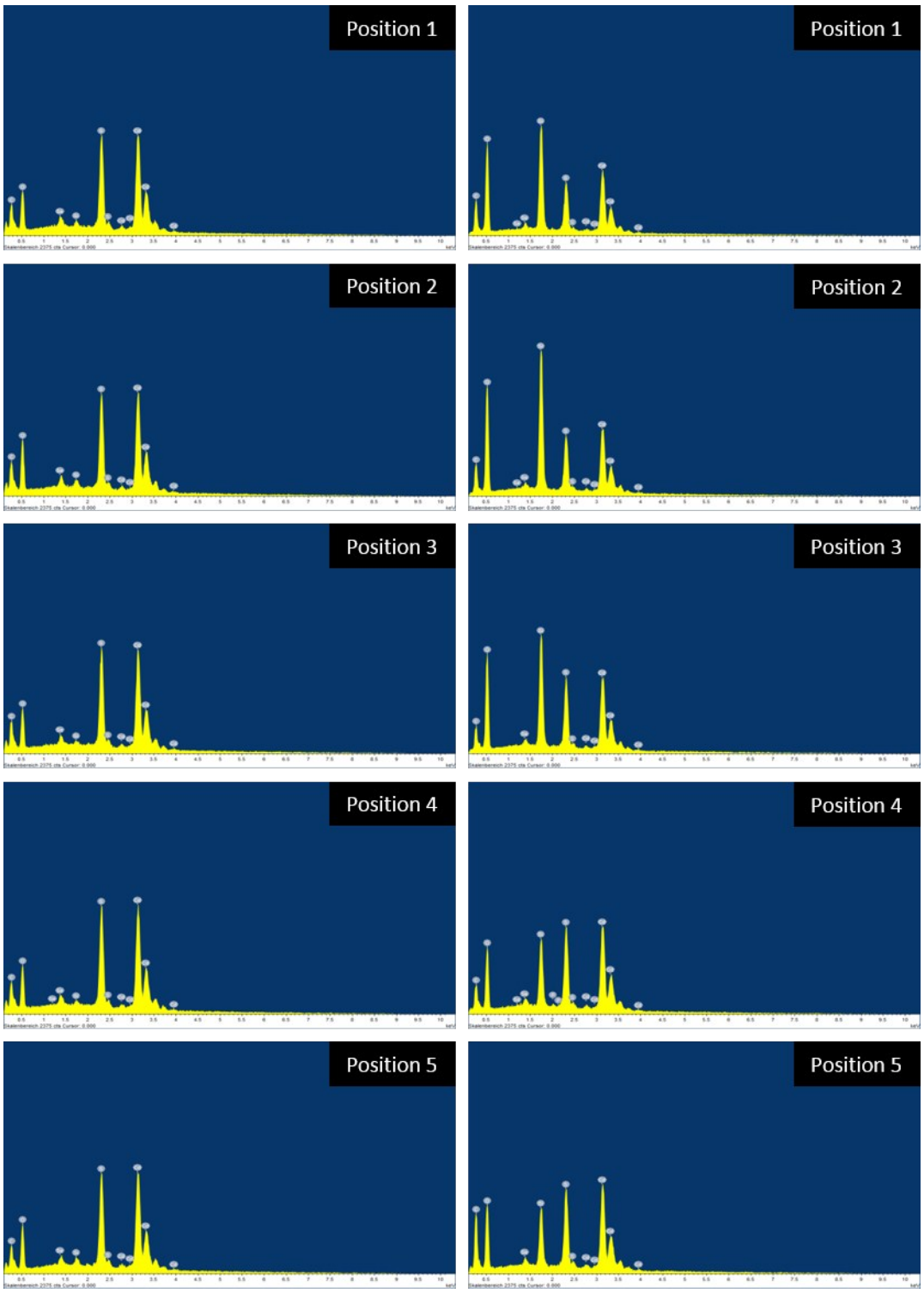


Figure S5. EDX spectra of unmodified (left) and modified (Cd/Si 1:1, right) networks at different measurement positions as indicated in figure S4.

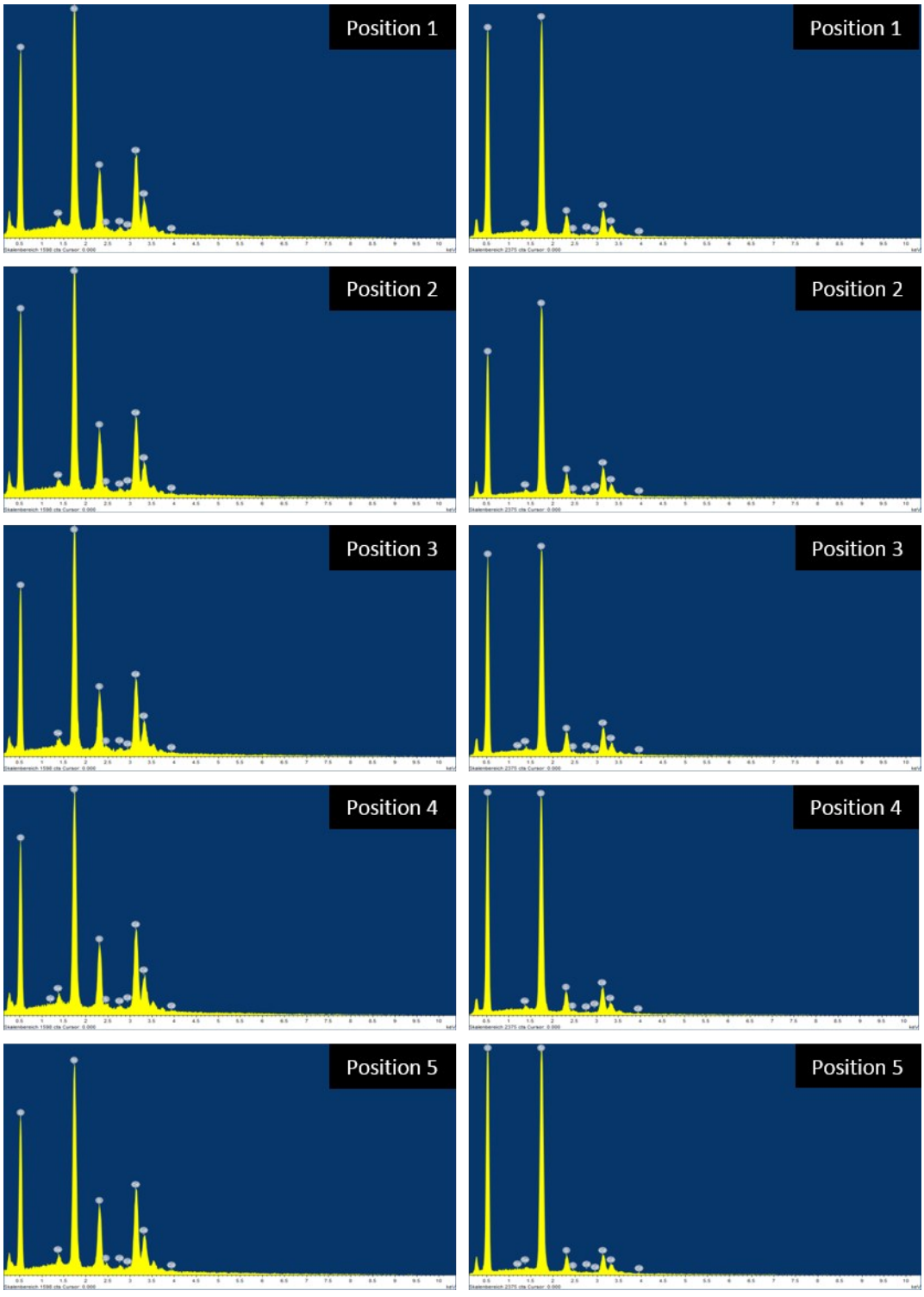


Figure S6. EDX spectra of modified networks, Cd/Si 1:2 (left) and Cd/Si 1:10 (right), at different measurement positions as indicated in figures 3 and S4.

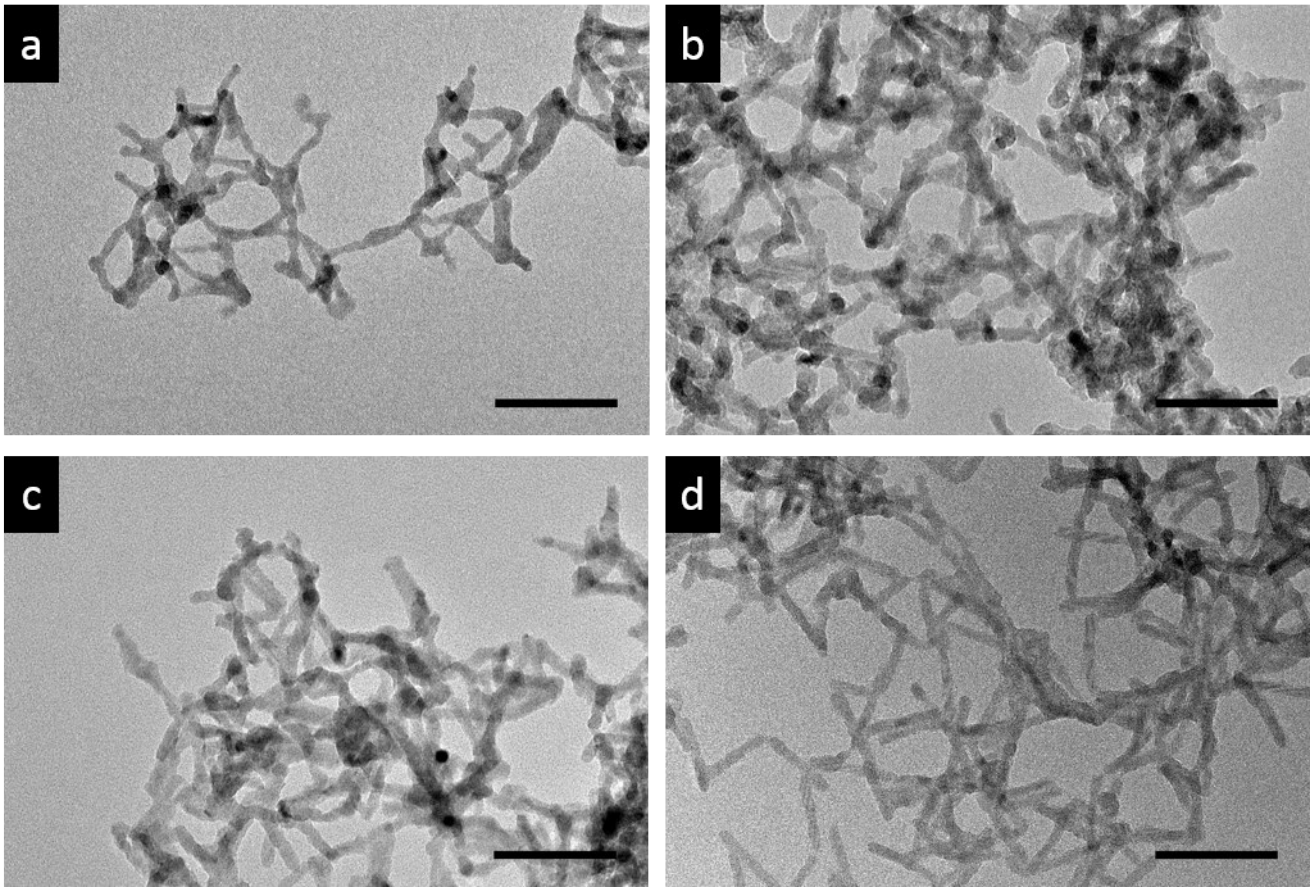


Figure S7. TEM micrographs of titania modified CdSe/CdS nanorod networks with increasing ratio of titania precursor added to cadmium content of the network, (a) 0/1, (b) 1/1, (c) 2/1, (d) 10/1. Scale bars correspond to 50 nm.

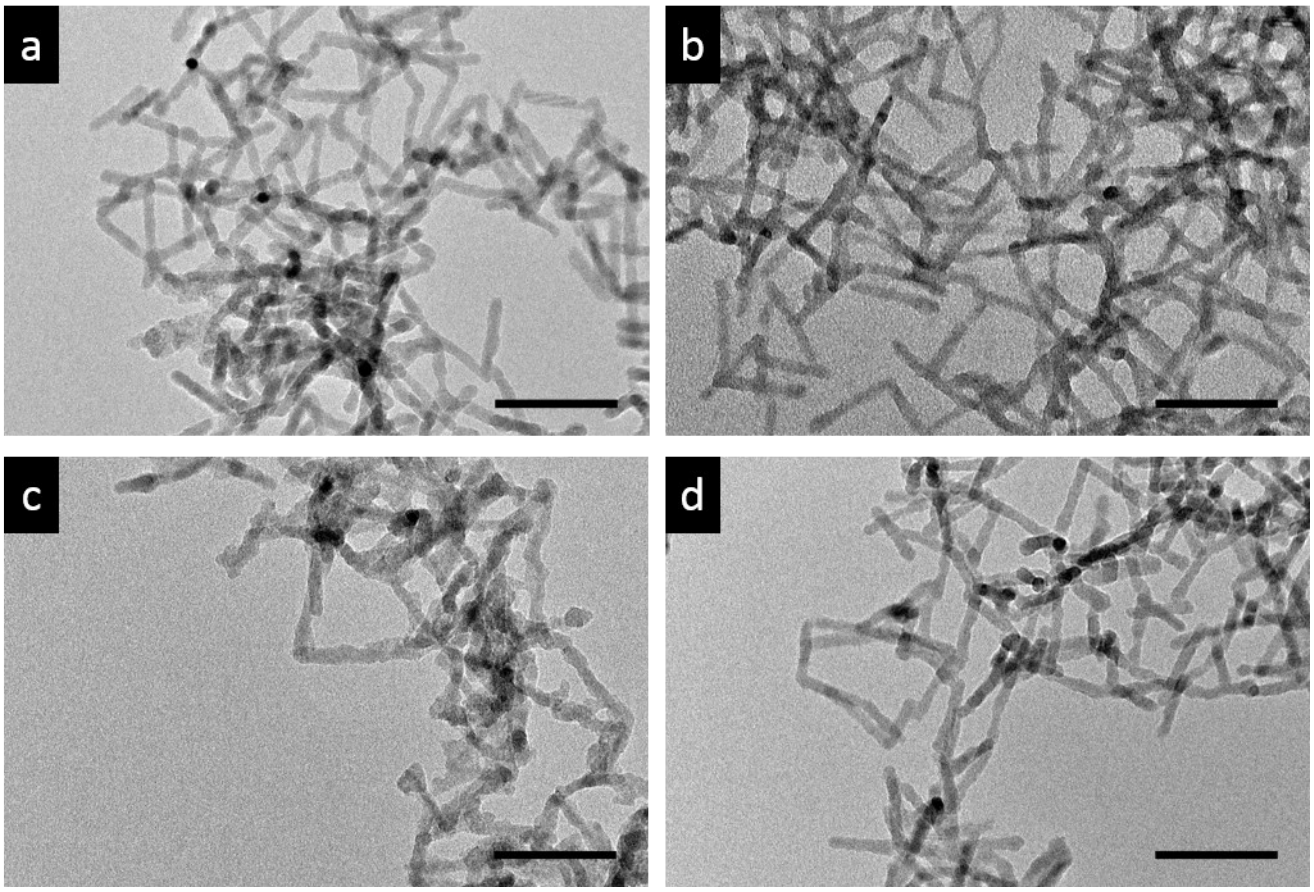


Figure S8. TEM micrographs of titania modified CdSe/CdS nanorod networks with increasing amount of acetylacetone added to the modification. Ti/acac-ratio: (a) 1/0, (b) 1/1, (c) 1/2, (d) 1/3. Scale bars correspond to 50 nm.

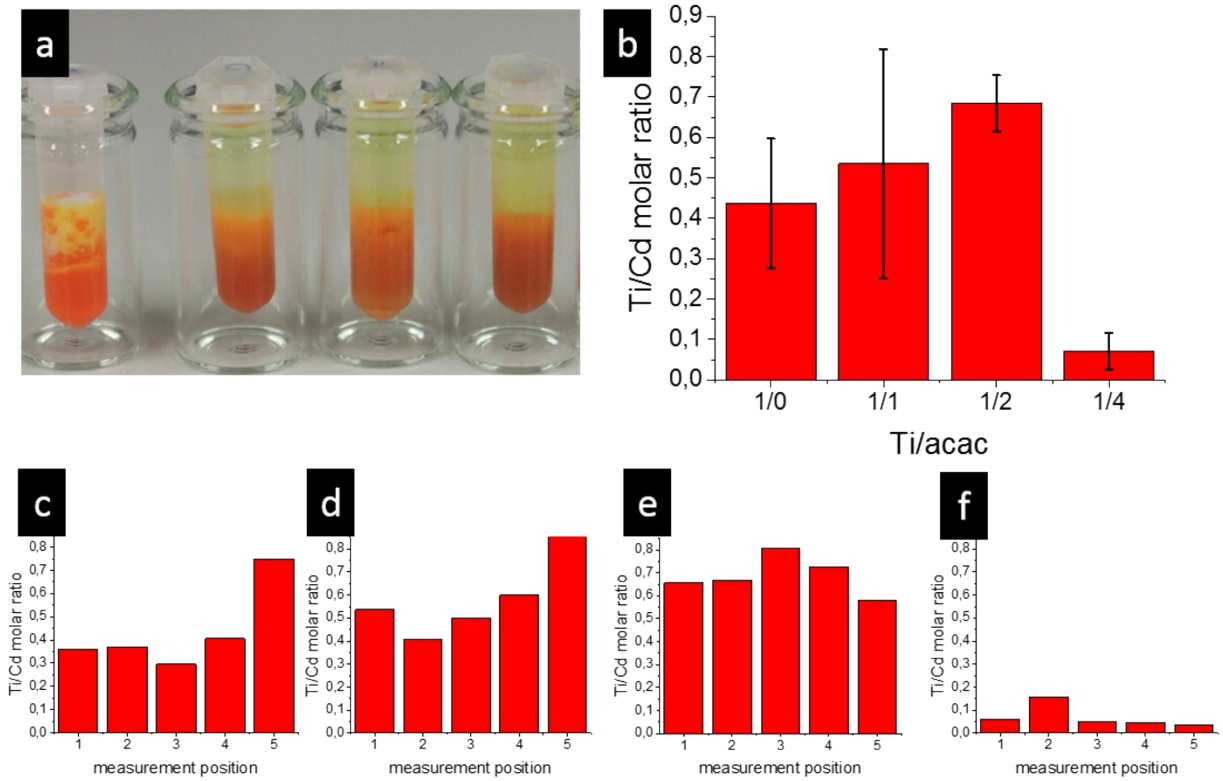


Figure S9. Influence of acetylacetone on homogeneity of titania shell. (a) Real color photographs of CdSe/CdS nanorod networks with titania shell employing different ratios of Ti/acac (from left to right 1/0 – 1/1 – 1/2 – 1/4), (b) Ti/Cd molar ratios by local EDX measurement in these networks with deviation derived from measurements at different positions of the network. Individual Ti/Cd molar ratios measured at different positions of the network for Ti/acac ratios (c) 1/0, (d) 1/1, (e) 1/2 and (f) 1/4.

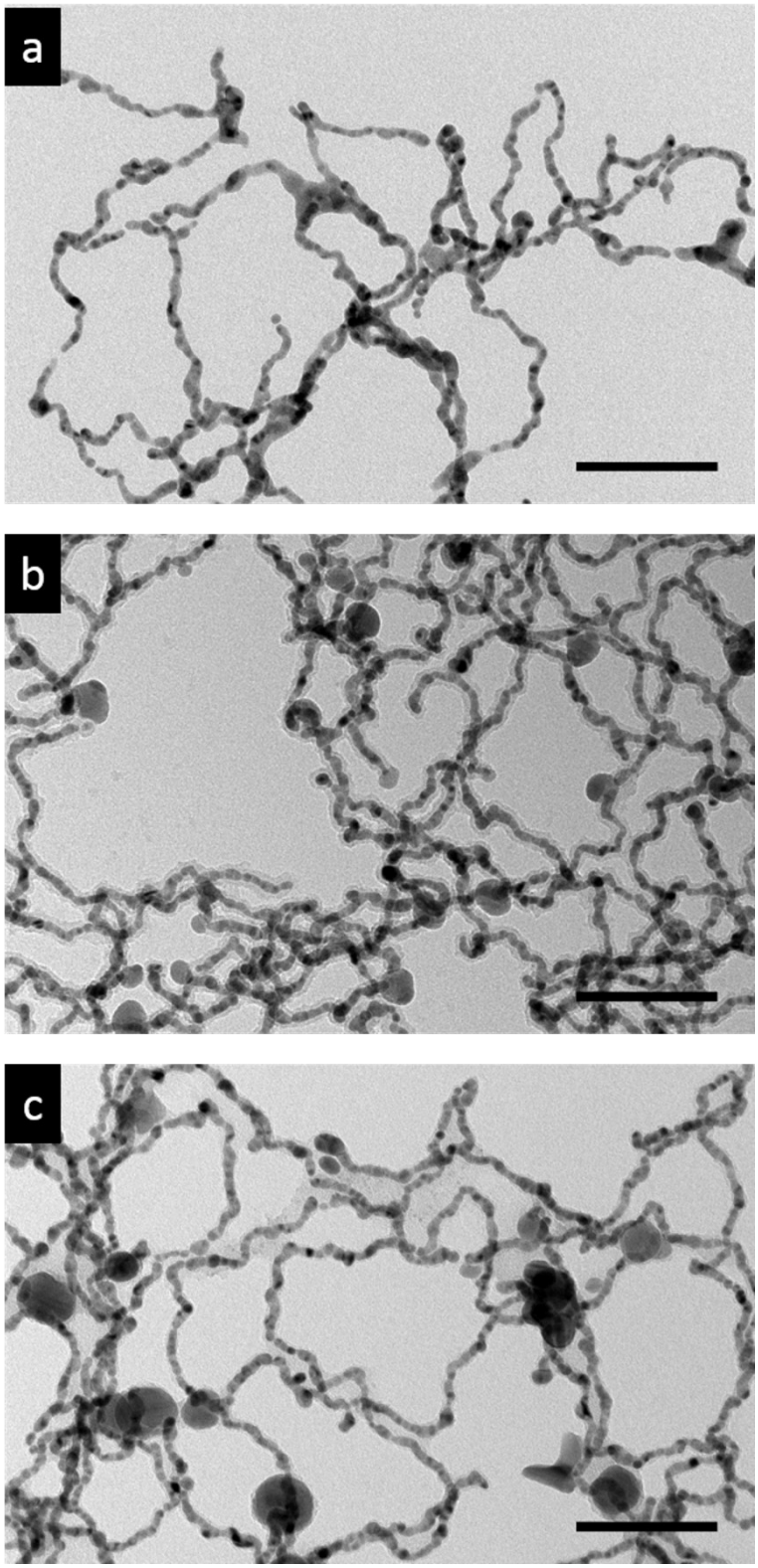


Figure S10. Au and Ag nanoparticle based network (a) before and (b) after silica shell growth with APTMS linker and (c) without APTMS linker added in the modification step. Scale bars correspond to 100 nm.

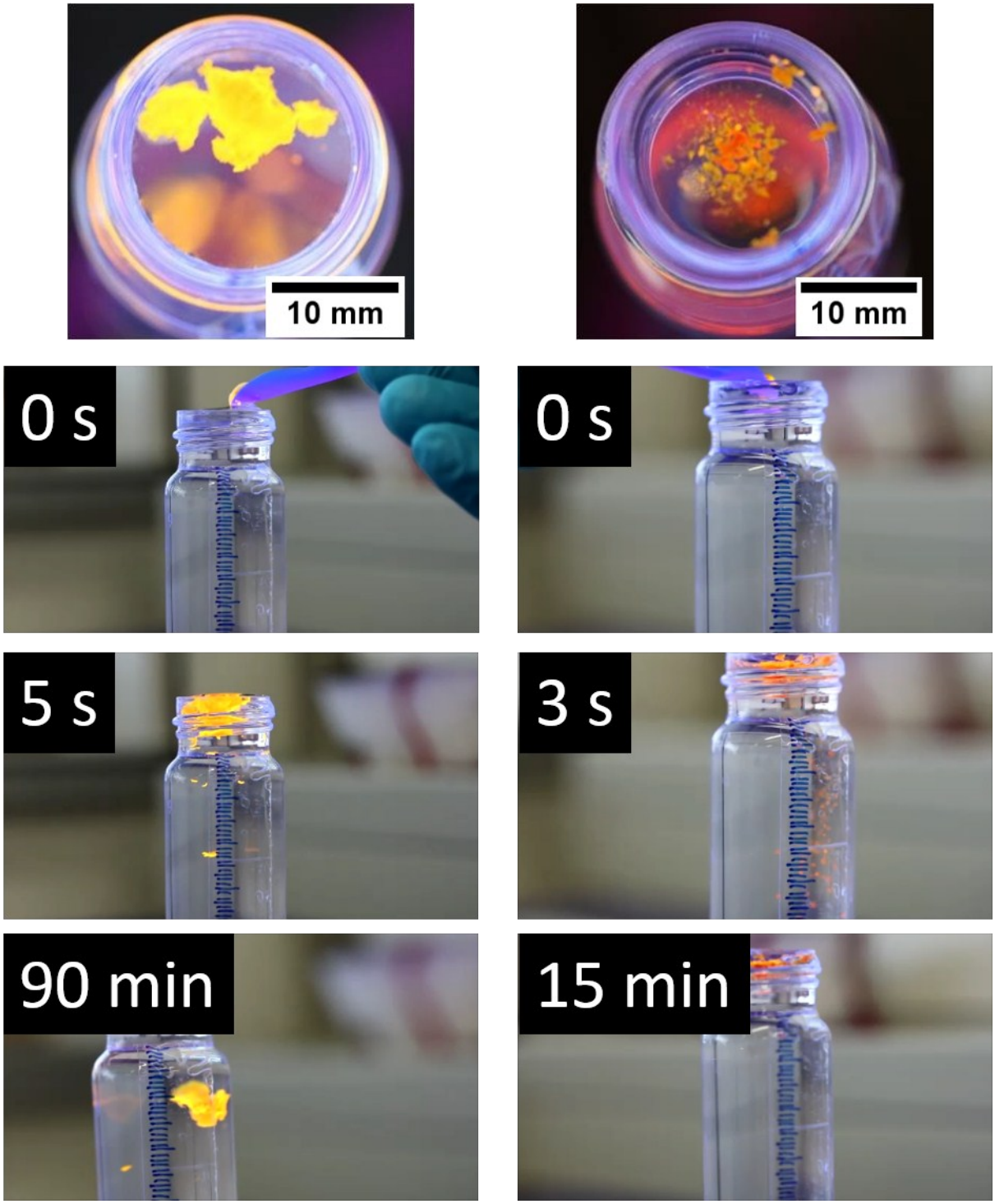


Figure S11. Rehydration experiment with silica modified (left) and unmodified (right) CdSe/CdS network structures shown at different time points (measured from addition of aerogel to water) under UV illumination as top and side view.

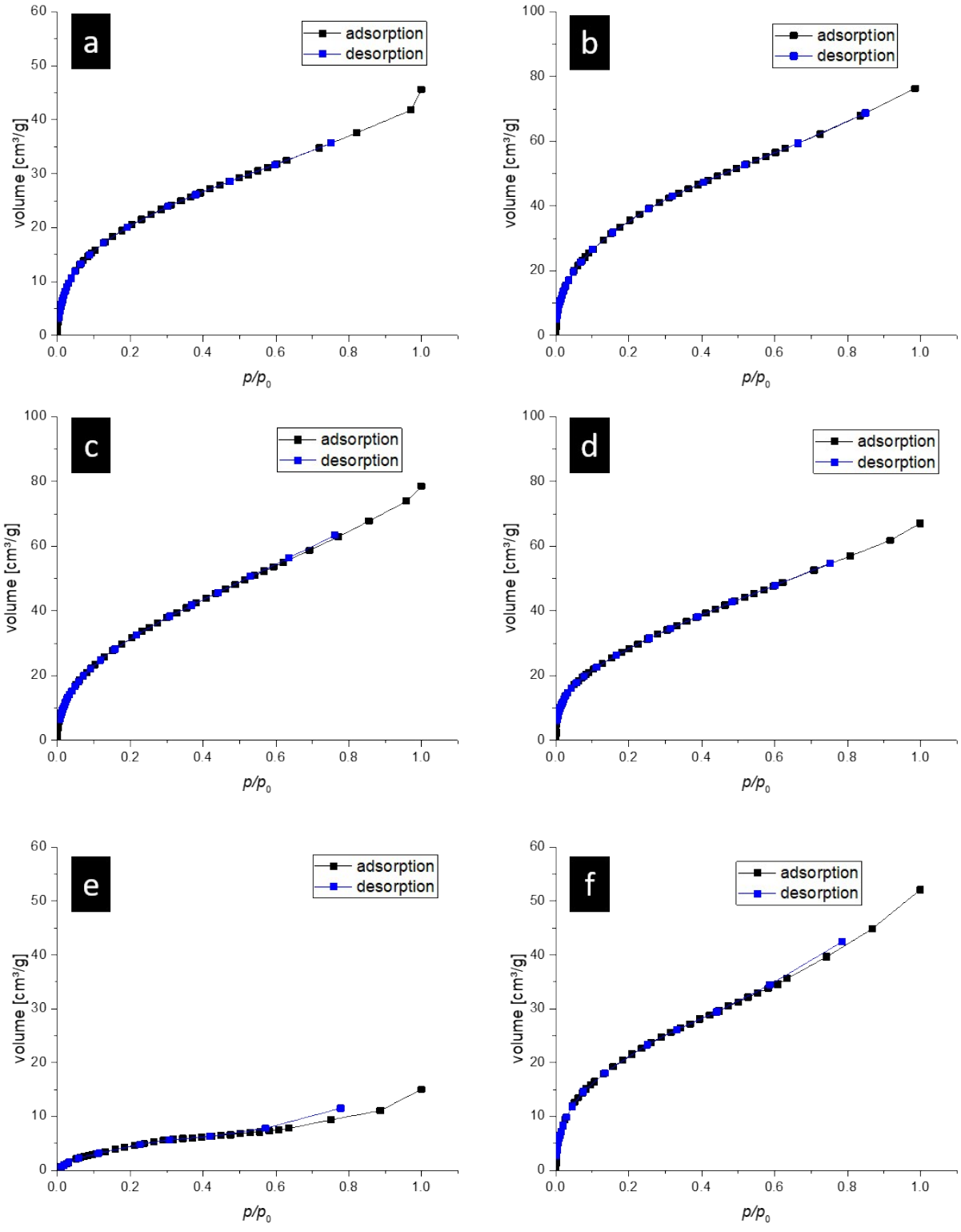


Figure S12. Krypton adsorption and desorption curves for different shell modified and prisine nanoparticle based networks. (a) CdSe/CdS nanorod based network, (b) CdSe/CdS nanorod based network after silica shell growth (Si/Cd 1:1), (c) CdSe/CdS nanorod based network after silica shell growth (Si/Cd 10:1), (d) CdSe/CdS nanorod based network after titania shell growth (Ti/Cd 10:1), (e) Au-Ag nanoparticle based network and (f) Au-Ag nanoparticle based network after silica shell growth (Si/noble metal 1:1)