

Supplementary Information

Aqueous Phase Near-Infrared Emitters: Water Transfer of Colloidal 2D PbS, PbSe and PbTe Nanoplatelets

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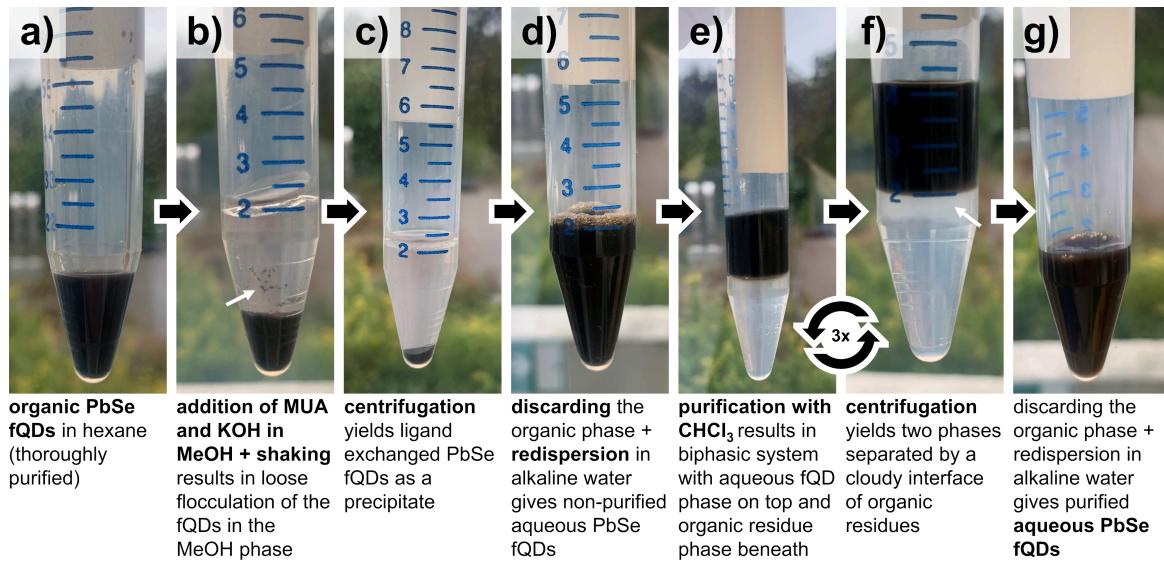


Figure S 1. Photo series showing the phase transfer process for the example of PbSe fQDs. (a) Thoroughly purified organic PbSe fQDs are dispersed in hexane. (b) Addition of a phase transfer solution (MUA and KOH in MeOH) results in the PbSe fQDs changing phase and loosely flocculating in the bottom MeOH phase. (c, d) Subsequent centrifugation followed by discarding of the biphasic supernatant and redispersion in water (0.1 M KOH) yields non-purified aqueous PbSe fQDs. (e-g) Purifying the aqueous PbSe fQDs with chloroform gives the final aqueous PbSe fQDs.

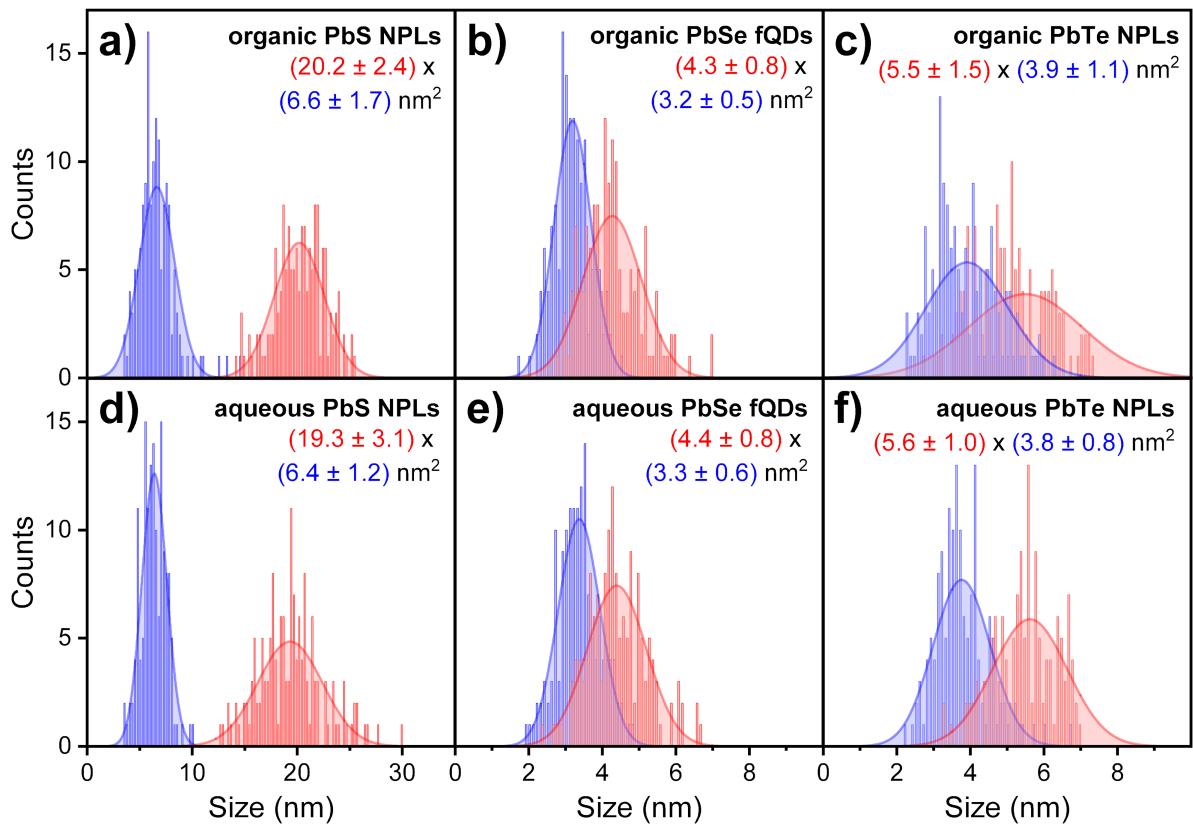


Figure S 2. Lateral size histograms of PbS NPLs, PbSe fQDs, and PbTe NPLs before (a – c) and after (d – f) phase transfer to water. The lateral sizes do not change significantly. x-Lengths (red) are the longest dimension of the fQDs and NPLs, y-widths (blue) were determined by measuring the largest distance perpendicular to the x-length. A sample size n of 150 NPLs was measured for each sample.

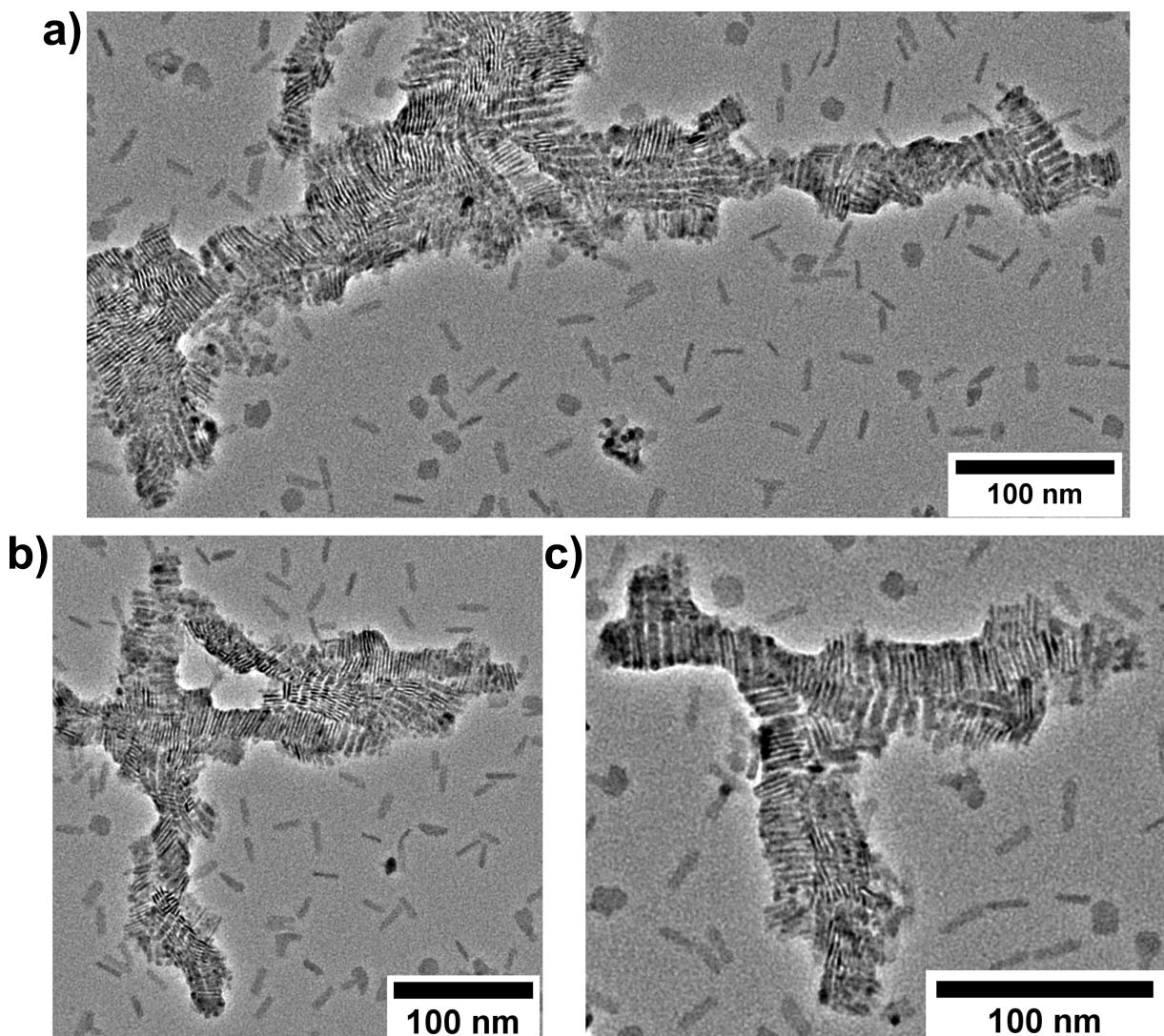


Figure S 3. TEM images of large stacks of vertically aligned 2D PbS NPLs (drop-casted from organic colloidal solution onto amorphous carbon-coated TEM grids). The rigorous purification before the phase transfer, accompanied by ligand stripping, promotes the formation of such stacks.

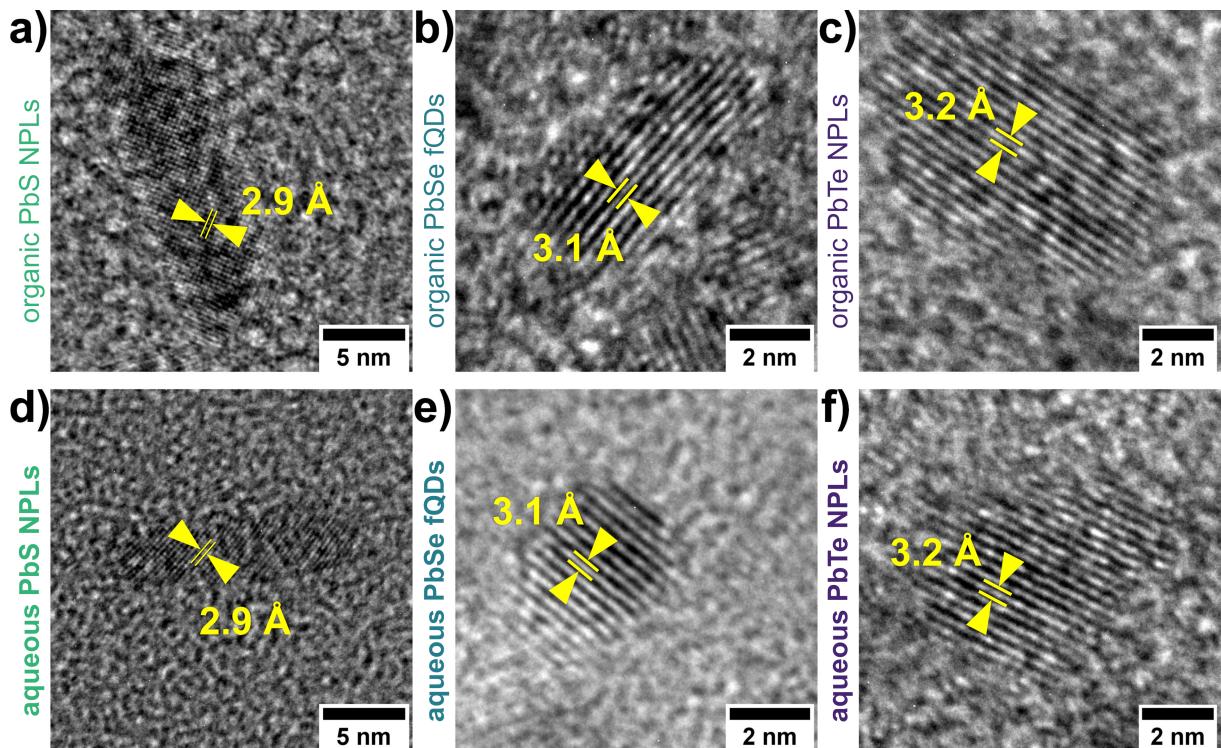


Figure S 4. High magnification TEM images of 2D PbX fQDs and NPLs before (a – c) and after (d – f) the aqueous phase transfer. The clearly visible lattice fringes underpin the crystallinity of the materials.

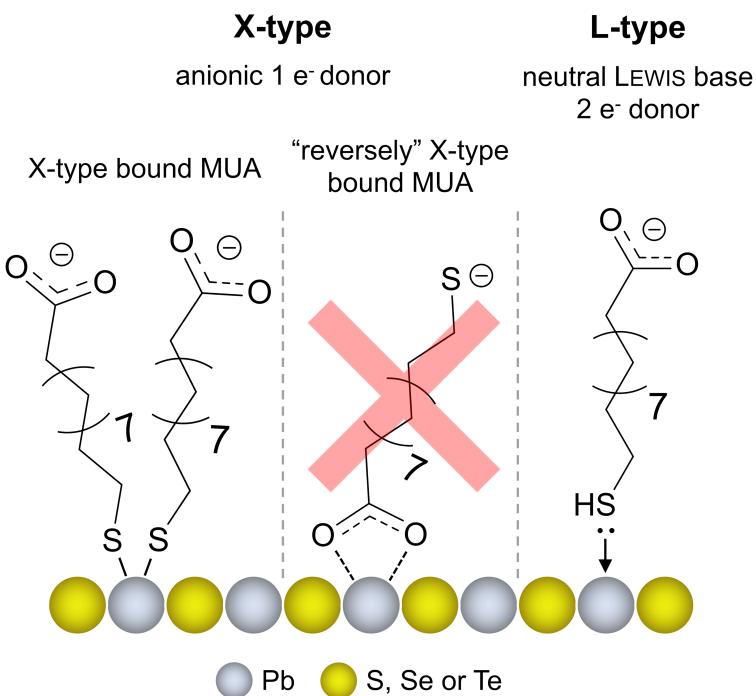


Figure S 5. Schematic representation of the possible binding motifs of MUA to the PbX NPL surface. By combining XPS and NMR measurements we rule out the presence of “reversely” X-type bound MUA and conclude on a combined passivation by X- and L-type bound MUA.