Supporting Information for

A facile method to study the bioaccumulation kinetics of amorphous silica nanoparticles by quantum dot embedding

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Calculation of the particle-number- and surface-area-based concentration of ^{QDs}AmSiNPs in the medium and their respective uptake rate

Taking into account the porous nature of the ^{QDs}AmSiNPs, the particle number per unit mass of Si (N, particles pg Si^{-1}) was calculated according to Eq. (S1):

$$N = \frac{\frac{1}{\rho} + V}{\frac{4}{3}\pi r^3} \quad \text{(S1)}$$

where ρ represents the physical density of amorphous SiO_2 (1.03 g Si cm^{-3}), V the pore volume of ^{QDs}AmSiNPs as measured by N_2 desorption analysis (cm^3 g Si^{-1}), and r the radius of the NPs (μm). Based on Eq. (S1), $[AmSiNPs]_{med\text{-}N}$ and V_N could be calculated as shown in Eqs. (S2) and (S3):

$$[AmSiNPs]_{med\text{-}N} = [AmSiNPs]_{med\text{-}m} \times N \times 10^9 \quad \text{(S2)}$$

$$V_N = V_m \times N \quad \text{(S3)}$$

According to $[AmSiNPs]_{med\text{-}N}$ and V_N, $[AmSiNPs]_{med\text{-}S}$ and V_S were further calculated using Eqs. (S4) and (S5):

$$[AmSiNPs]_{med\text{-}S} = [AmSiNPs]_{med\text{-}N} \times 4\pi r^2 \quad \text{(S4)}$$

$$V_S = V_N \times 4\pi r^2 \quad \text{(S5)}$$

Here, the surface area ($4\pi r^2$, μm^2 $particle^{-1}$), as the area of the outer surface of ^{QDs}AmSiNPs (not including the area of the pore surface), was used instead of the specific surface area. Although the latter was much higher than the former, the area of the pore surface is hardly able to contact the cell membrane such that its contribution to the speed of membrane

39 invagination can be considered to have been negligible and was not used herein.

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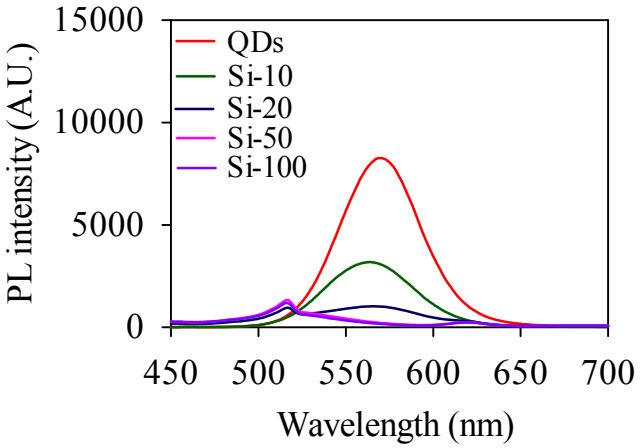

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43 **Fig. S1** The photoluminescence intensity of QDs, Si-10, Si-20, Si-50, and Si-100.

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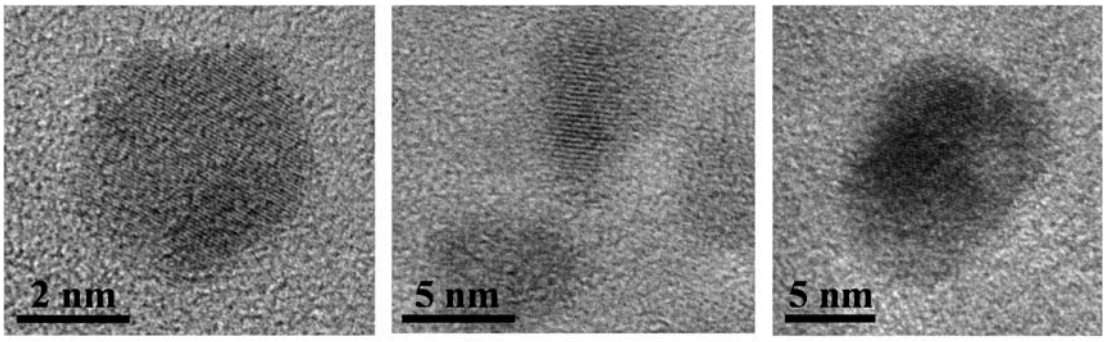

Fig. S2 The high resolution TEM image of (A) CdSeTe, (B) QDs, and (C) Si-10.

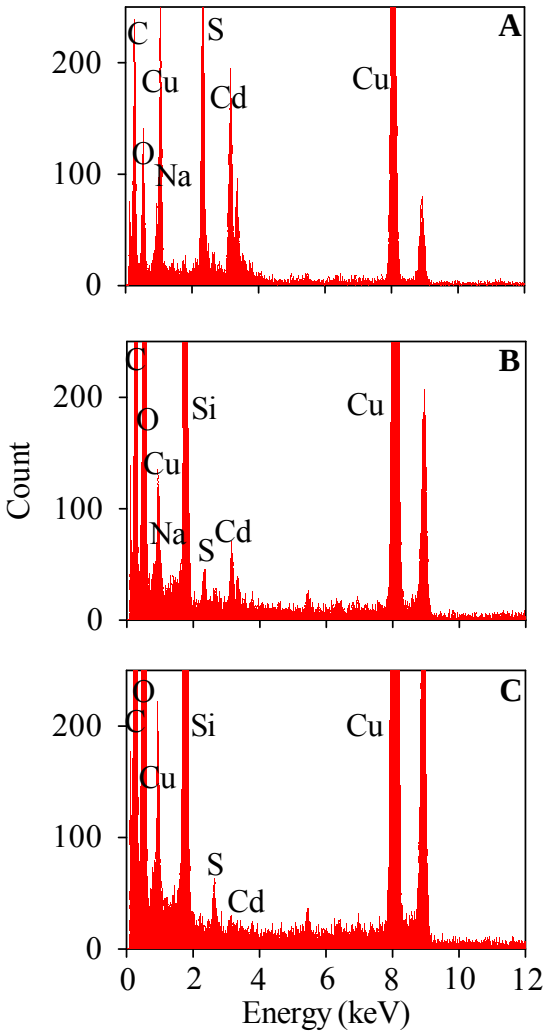

Fig. S3 The energy-dispersive X-ray spectra of (A) CdSeTe, (B) QDs, and (C) Si-10.