Supporting information

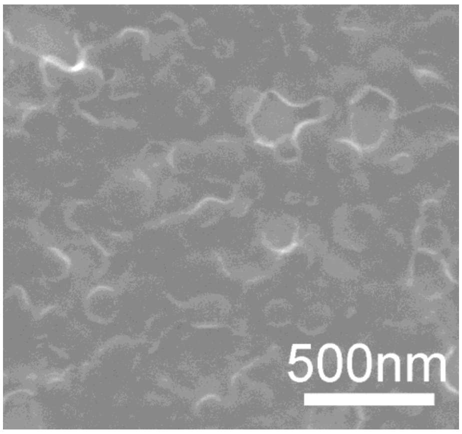

Fig. S1 SEM image of the modified TBADN NPs.

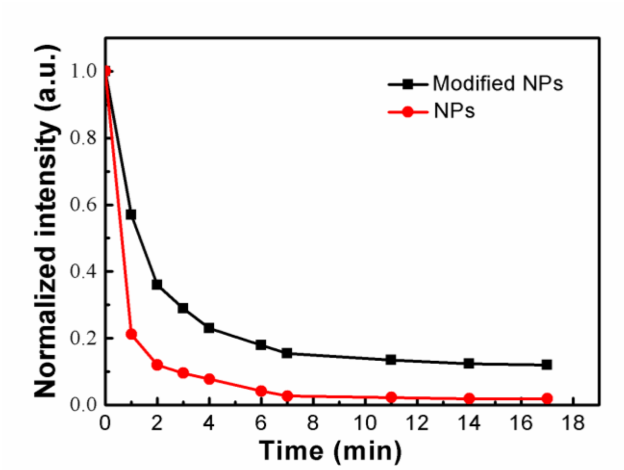

Fig. S2 Photostability comparison of the TBADN NPs and modified NPs (the samples are continuously irradiated by 450 W xenon lamp).

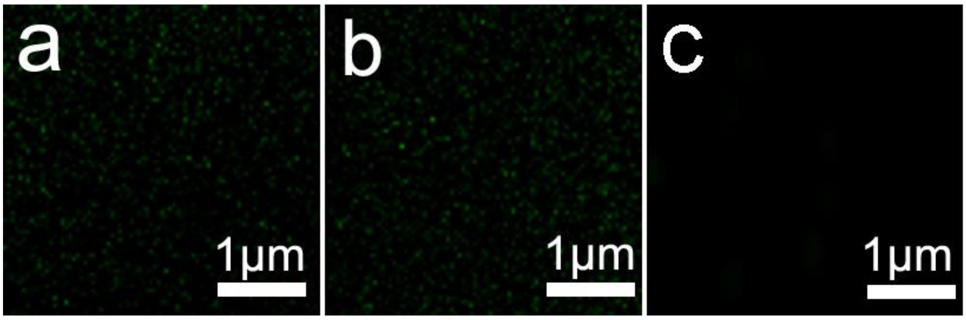

Fig. S3 Confocal images of CdSe/ZnS QDs (a) and TBADN NPs (b) control group(c) under same excitation 405 nm 6% laser power.

It is estimated that density of NPs is approximately the same with that of water (ρ = 1.0 g/mL), due to the fact that NPs can suspend in water. Diameter of NP is about D = 100 nm, r = 50 nm and molecular weight of TBADN M = 486 g/mol. Thus

Volume of a single NP: $V = 4/3\pi r^3 = 5 \times 10^{-16}$ m^3.

Molecular weight of TBADN: $m_0 = M/N_A = 8\times10^{-22}$ g.

A single NP weight: $m = \rho v = 4/3\pi r^3\rho = 1.8\times10^{-16}$ g.

Molecular numbers in one NP: $N = m/m_0 = 0.7 \times 10^6$.

The molar absorptivity of NPs can be calculated by measurement of absorptions of different concentrations of TBADN $\varepsilon = 0.77 \times 10^4\ M^{-1}cm^{-1}$.

Fluorescence quantum yield of TBADN η = 15%.

Fluorescence intensity per **NP** $\mathbf{I_{(NP)} = K \times (\varepsilon \times N \times \eta) = 7.7 \times 10^8\ K}$.

For the blue emitting CdSe@ZnS QDs,

Fluorescence quantum yield η = 90 ~100%.

Molar absorptivity $\varepsilon = 10^6\ M^{-1}cm^{-1}$.

Fluorescence Intensity per **QD** $\mathbf{I_{(QD)} = K \times (\varepsilon \times N \times \eta) = 10^6\ K}$.

It can be seen that the brightness of each TBADN NP is about 800 times higher than that of each CdSe@ZnS QDs If particle size is considered as well, TBADN NPs show comparable, if not higher, brightness with CdSe@ZnS QDs , which is well consistent with the confocal images.

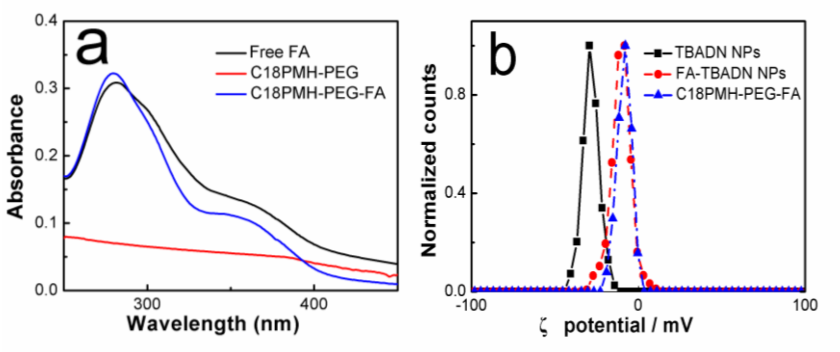

Fig. S4 (a) UV-vis absorbance spectra of free FA, C18PMH-PEG, and C18PMH-PEG-FA. (b) Surface charge of TBADN NPs, functionalized TBADN NPs and C18PMH-PEG-FA (dispersed in water, 0.012 mg/mL). We found that the mean ζ potential were -27.33 ± 1.29 mV, -10.90 ± 0.69 mV, and -8.94 ± 0.91 mV for the TBADN NPs, FA-TBADN NPs and C18PMH-PEG-FA respectively.