Water-Soluble, Luminescent ZnTe Quantum Dots: Superstauration-Controlled Synthesis and Self-Assembly into Nanoballs, Nanonecklaces and Nanowires

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Supplementary Information

1 Experimental Section

Preparation of NaHTe:

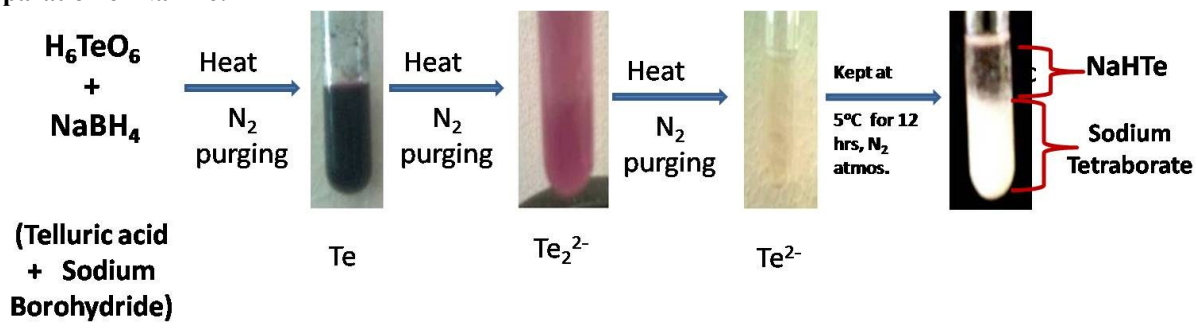

Figure.S1. Pictorial view of the various steps involved in preparation of NaHTe solution**.**

2Particle Size Analysis by UV-Visible Spectroscopy:-At first, size of nanoparticles was determined by UV-visible spectroscopy . First derivative of A(absorbance) vs E (energy) graph was plotted and band gap was determined from the maxima of the dA/dE vs E plot .From the following equation (as given in ref.12) , bandgap of nanoparticles was determined.

$\Delta E_g = E_{g(NP)} - E_{g(bulk)}$ $E_{g(NP)}$ at pH 6 1S is-3.5438

For ZnTe, $E_{g(bulk)}$ =2.1 eV

$\Delta E_{g \Rightarrow}$ 3.5438-2.1=1.44 eV

After determination ΔE_g size was calculated from the correlation given by [16].

$\Delta E_g = a_1 e^{-d/b_1} + a_2 e^{-d/b_2}$ Where, a_1 = 5.10, a_2= 1.05 b_1= 10.35, b_2= 97.93

For the synthesis at pH 6. the average size of ZnTe QDs was found to be 2.1, 1.9, 1.8,1.7)nm for varying supersaturation, 1S, 4S, 6S, 10S, respectively. For the synthesis at pH 12, the average size of ZnTe QDs was found to be 2.2, 1.9, 1.7. 0.8 nm, for varying supersaturation, 1S, 4S, 6S, 10S, respectively.

Zeta Potential measurments:

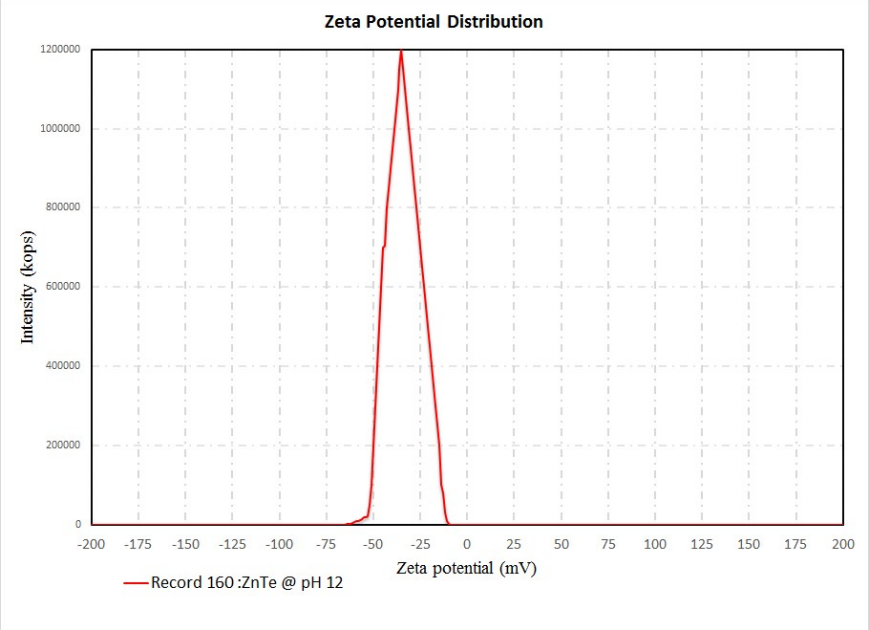

Figure S2: Zeta Potential measurement for ZnTe QDs @pH 12: **-35 mV**

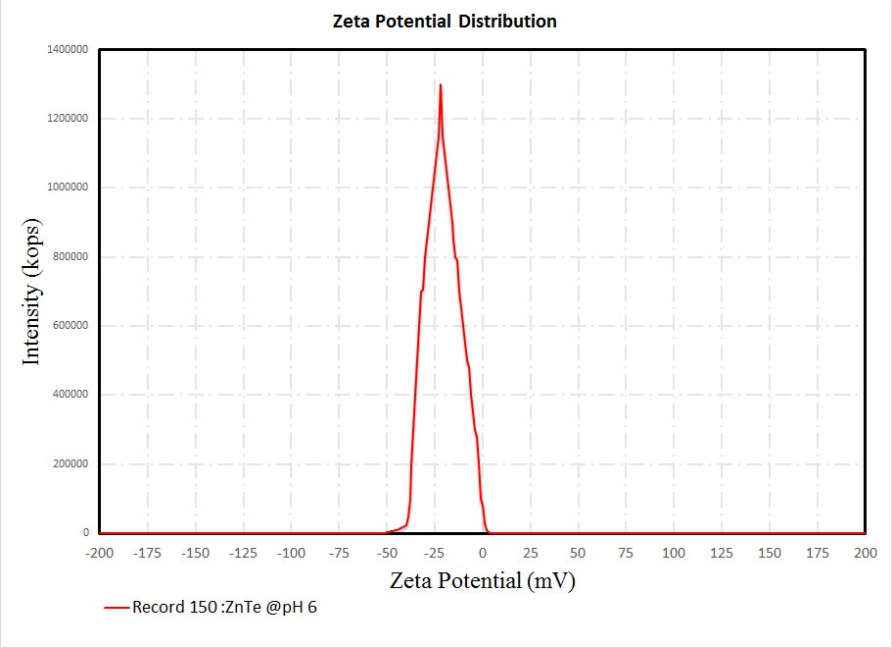

Figure S3: Zeta Potential measurementr for ZnTe QDs @pH 6: **-22 mV**

DLS (Dynamic Light Scattering)Measurements:

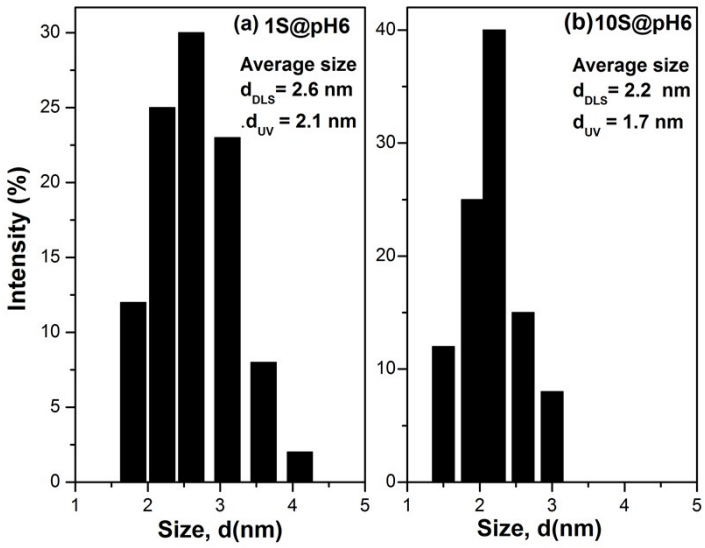

Figure S4: Size distribution pattern as obtained in DLS measurements of TGA-capped ZnTe QDs prepared at pH 6 with relative supersaturation of 1S (a) and 10S (b).

EDX ananlysis:

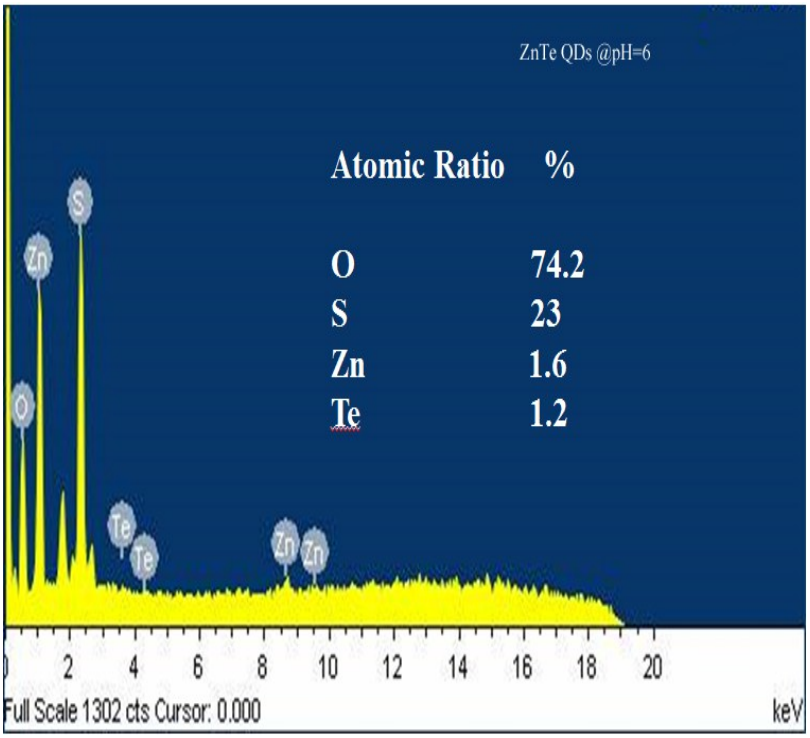

Figure S5: EDX spectrum for TGA-capped ZnTe QDs prepared at pH

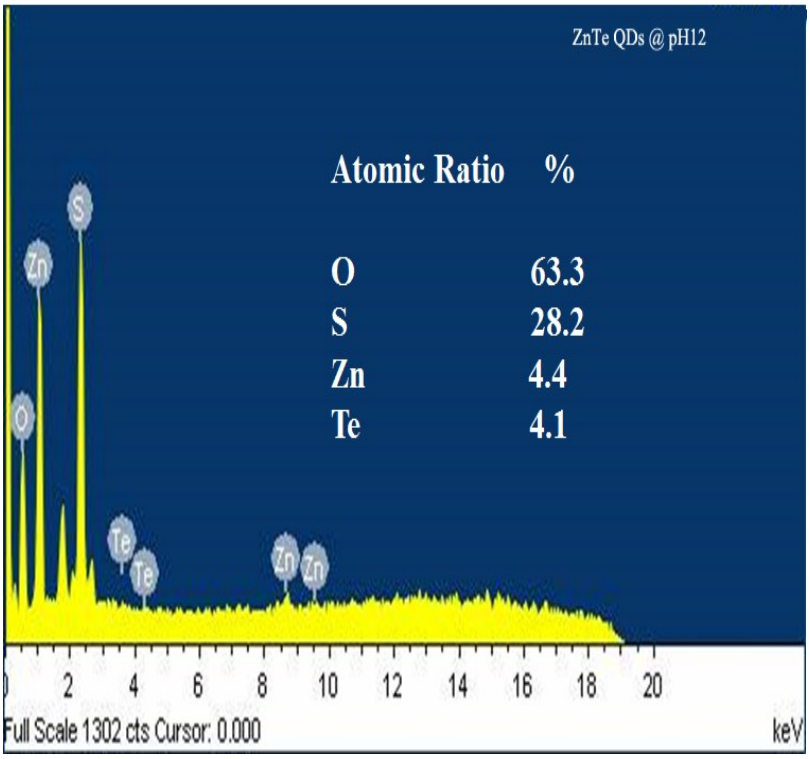

Figure S6: EDX spectrum for TGA-capped ZnTe QDs prepared at pH 12

On analyzing the EDX spectra, Zn: Te ratio has been found to be 1:0.75 and 1: 0.93 respectively, for syntheses at pH 6 and pH 12.