Well defined quantum dots and broadening of optical phonon line from hydrothermal method

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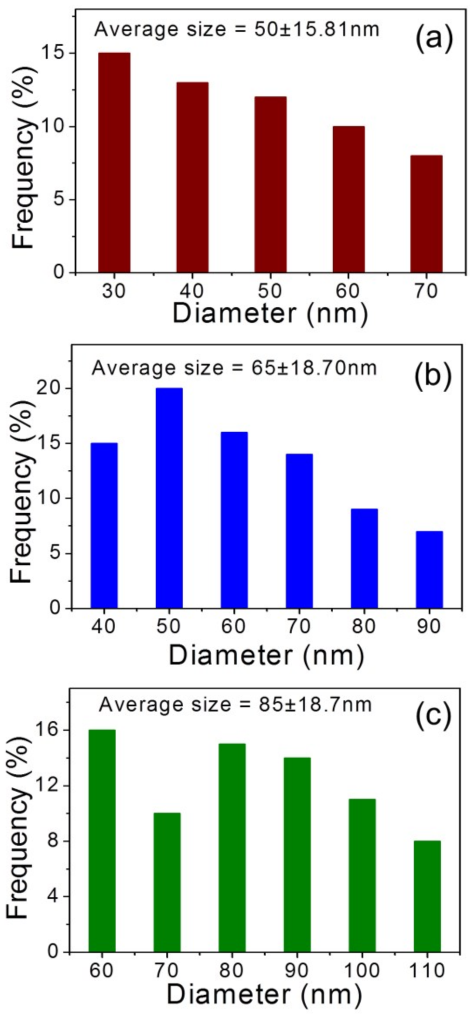

Fig. S1 (a), (b) & (c) divulge histograms of particle size distribution of PbTe NPs synthesized with different surfactants (12-2-12), (14-2-14) & (16-2-16) respectively.

FTIR Measurements

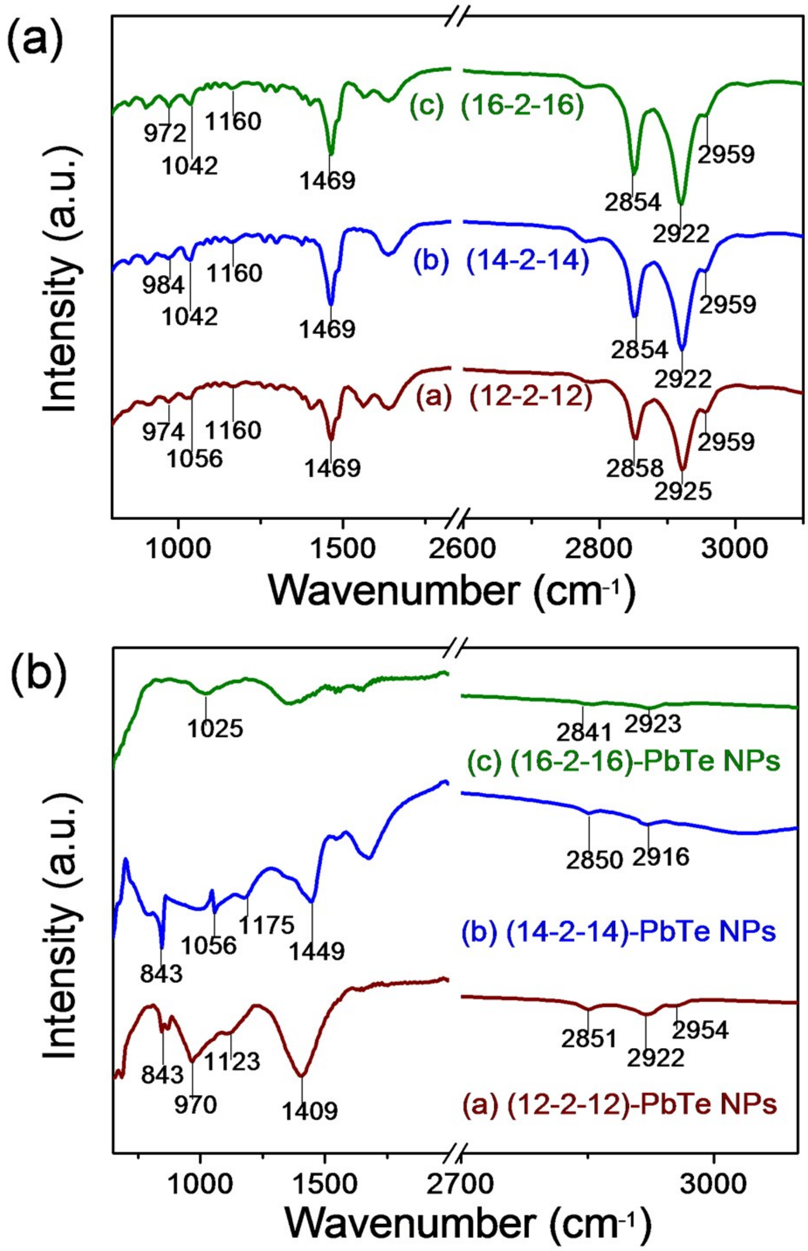

Fig. S2. FTIR spectra of (a) pure Gemini surfactants and (b) PbTe NPs synthesized with (12-2-12), (14-2-14) and (16-2-16) Gemini surfactants.

FTIR measurements were performed to demonstrate whether the lead telluride nanoparticles are undeniably capped by Gemini surfactants. In FTIR measurements, lead telluride capped by Gemini surfactants were compared with the corresponding pure surfactants. Fig. S1 a & b shows the representative FTIR spectra of pure (12-2-12), (14-2-14) and (16-2-16) and surfactants capped lead telluride nanoparticles respectively. It is well known that the symmetric and asymmetric stretching vibrations of methylene can be used as an indicator of the ordering of the alkyl chains and higher energies of stretching vibrations correspond to more gauche defects. The symmetric and asymmetric stretching vibrations of methylene of pure surfactants are located at 2854, 2858, 2922, 2925 and 2959 cm^{-1} which shifts to 2851, 2922 and 2954 cm^{-1} for (12-2-12) capped nanoparticles, 2850 and 2916 cm^{-1} for 14-2-14 capped nanoparticles and 2841 and 2923 cm^{-1} for (16-2-16) capped nanoparticles. Scissoring mode of vibrations (δs(C−H)) at 1469 cm^{-1} for pure surfactants shifts to 1409 and 1449 cm^{-1} for (12-2-12) and (14-2-14) capped lead telluride NPs respectively. In the low wave number region, the intensities of ν(C-N^+) stretching modes for pure surfactant appeared at 1160, 1056, 1042, 984, 974 and 972 cm^{-1}. These peaks shifted to 1123, 970 and 843 cm^{-1}, 1175, 1056 and 843 cm^{-1} and 1025 cm^{-1} for (12-2-12), (14-2-14) and (16-2-16) capped lead telluride nanoparticles respectively [40-41].

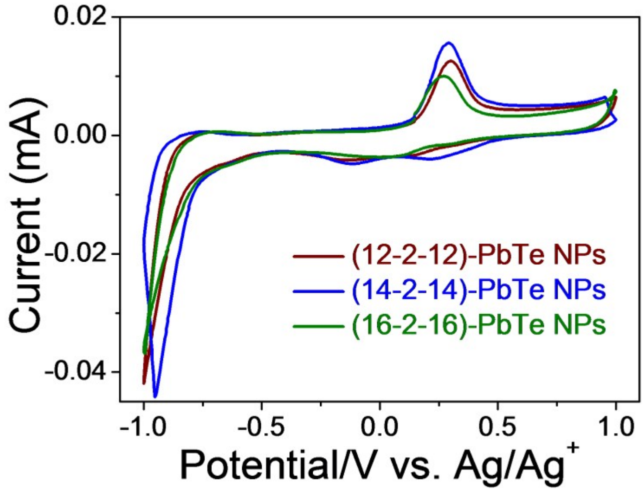

Fig. S3. Cyclic voltameteric studies for lead telluride nanoparticles.

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