Electronic Supplementary Material (ESI) for Nanoscale Advances.

Supporting Information

Green Luminescent MoS_2-CdTe Hybrid Nanostructure Synthesized through Surface Charge Interaction

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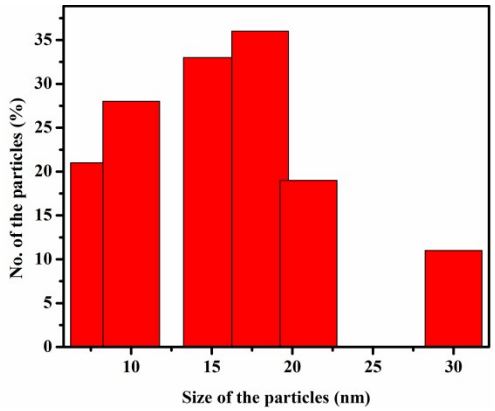

Figure S1: Size distribution histogram of MoS_2 QDs.

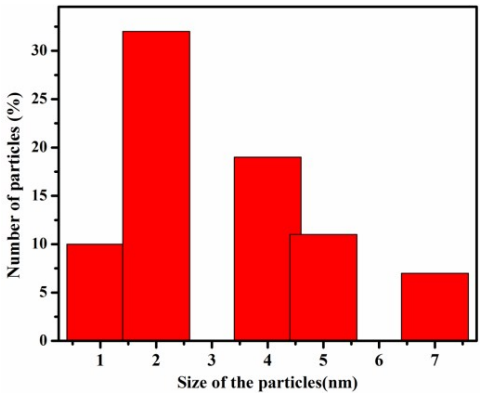

Figure S2: Size distribution histogram of green CdTe QDs.

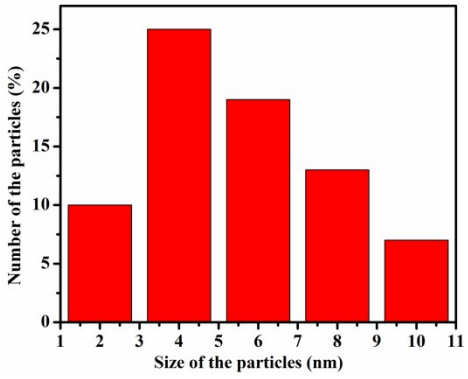

Figure S3: Size distribution histogram of yellow CdTe QDs

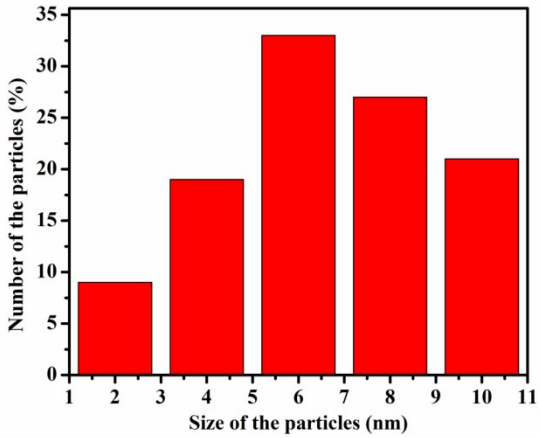

Figure S4: Size distribution histogram of red CdTe QDs.

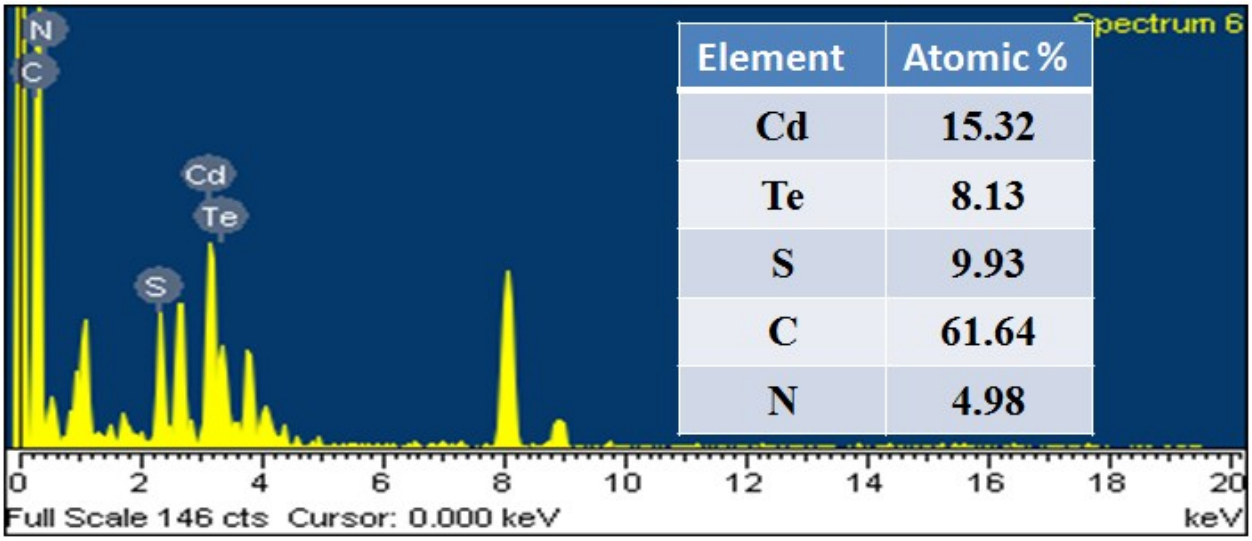

Figure S5: EDX analysis of cysteamine capped CdTe QDs.

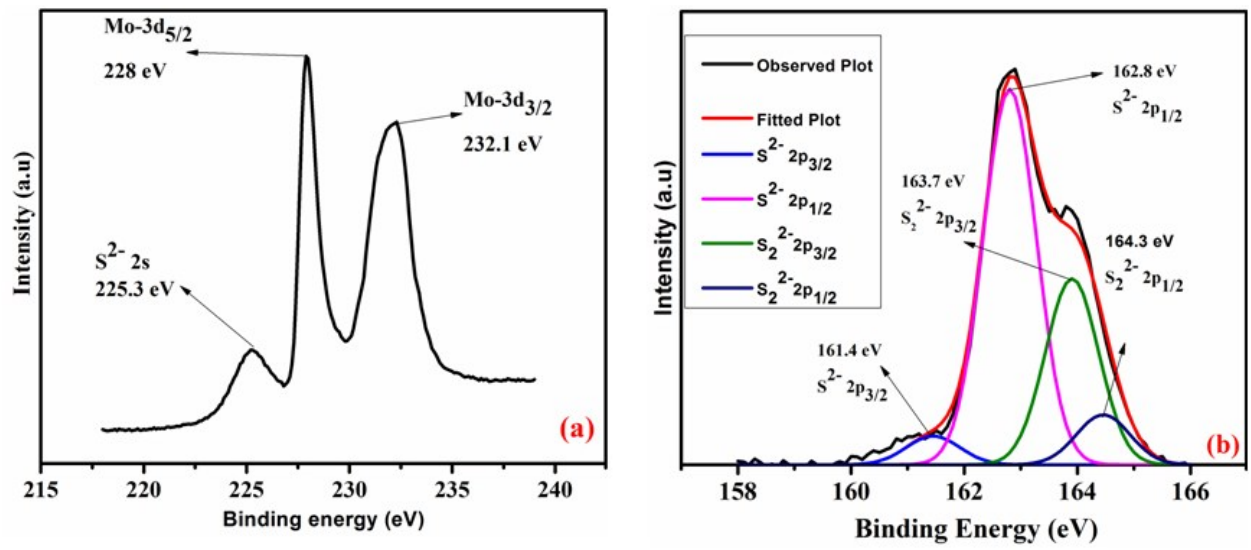

Figure S6. XPS spectra of S^{2-}-2s, Mo(IV)-$3d_{5/2}$ and $3d_{3/2}$ in bare amorphous MoS_2 QDs and (b) Deconvoluted XPS spectra of S^{2-}-$2p_{3/2}$ and $2p_{1/2}$ and S_2^{2-} $2p_{3/2}$ and $2p_{1/2}$ in bare amorphous MoS_2 QDs.

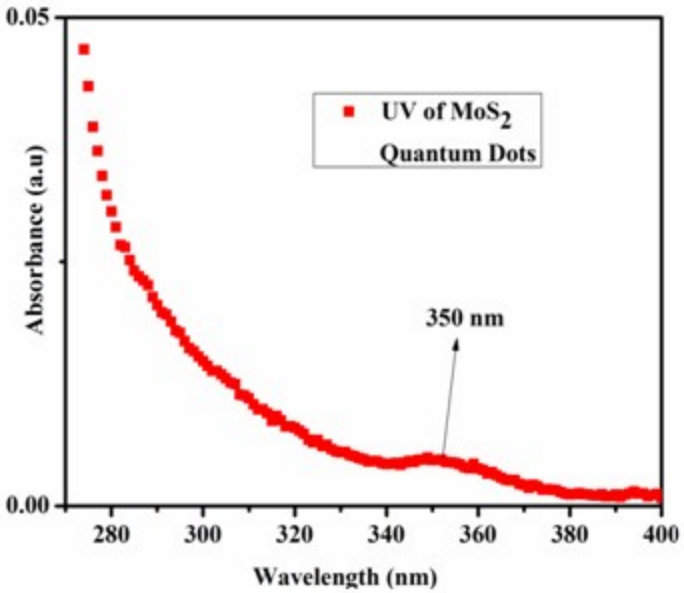

Figure S7: UV-visible absorption spectroscopy of MoS_2 QDs.

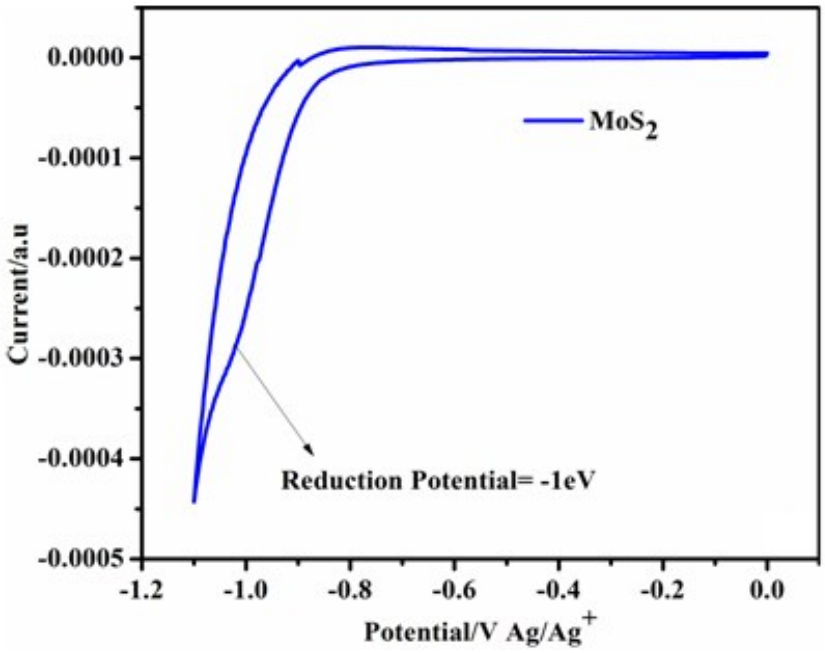

Figure S8: Cyclic voltametry of amorphous MoS_2 QDs.

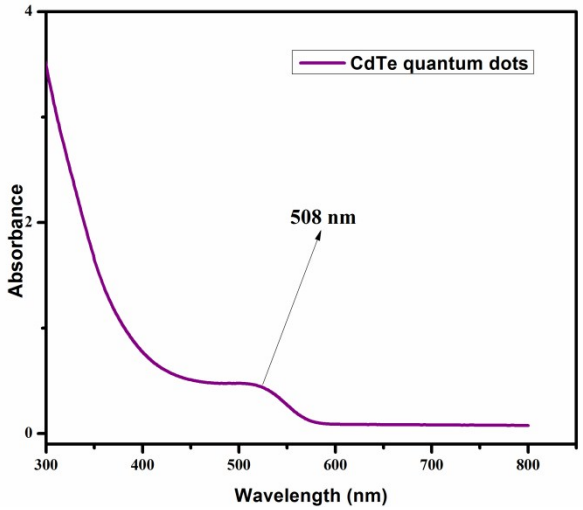

Figure S9: UV-visible absorption spectroscopy of cysteamine capped CdTe QDs.

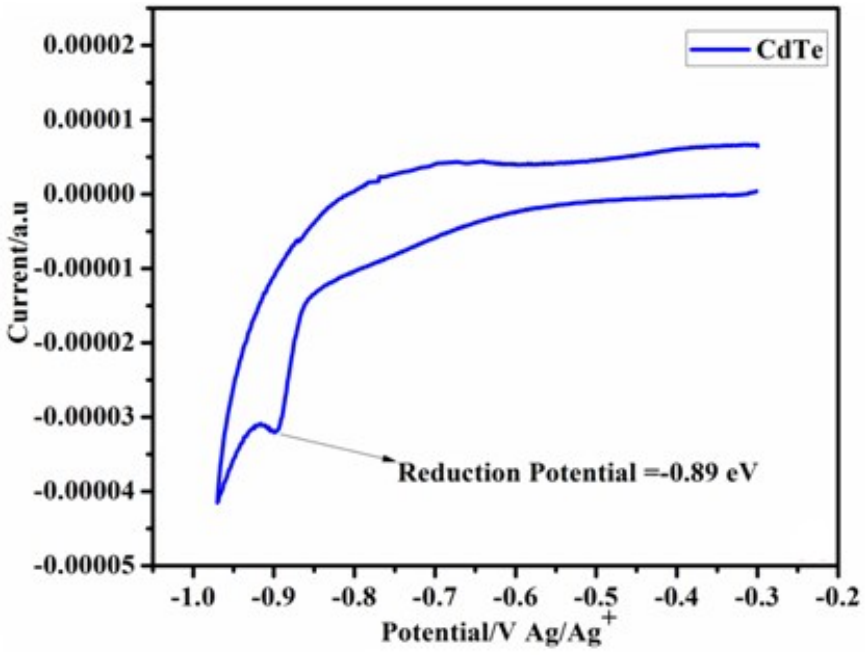

Figure S10: Cyclic voltametry of cysteamine capped CdTe QDs.

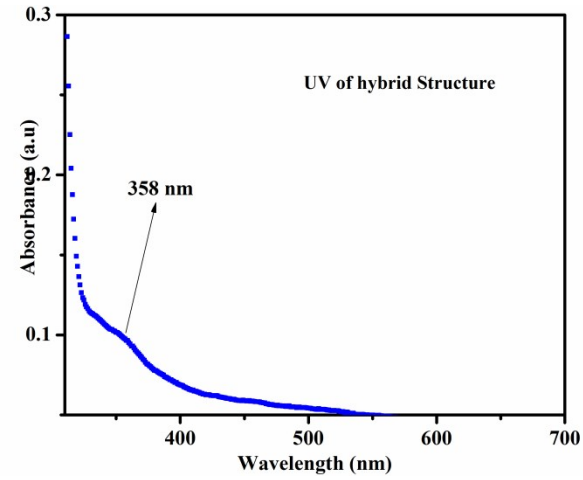

Figure S11: UV-visible absorption spectroscopy of hybrid structure.

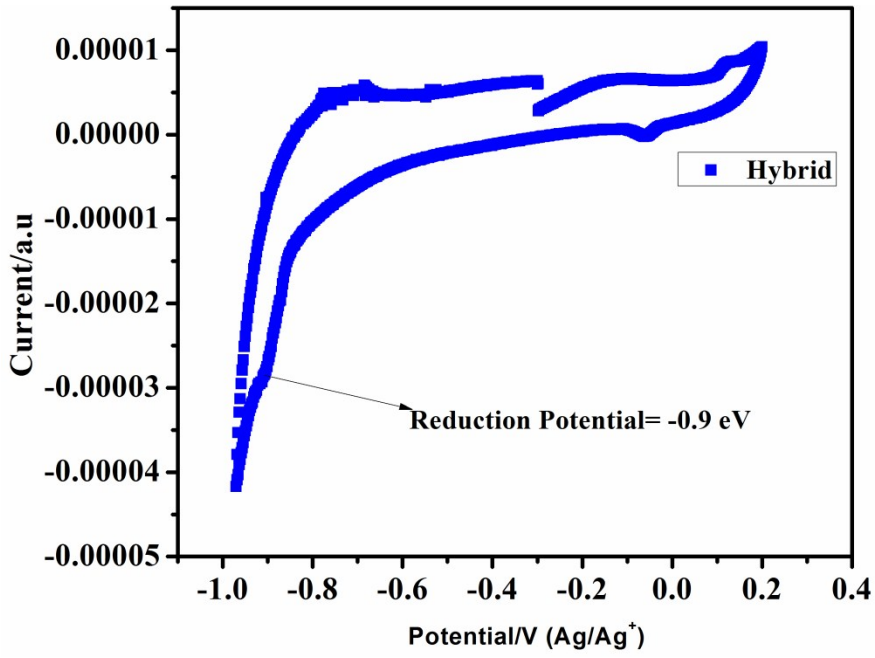

Figure S12: Cyclic voltametry of cysteamine capped CdTe QDs.

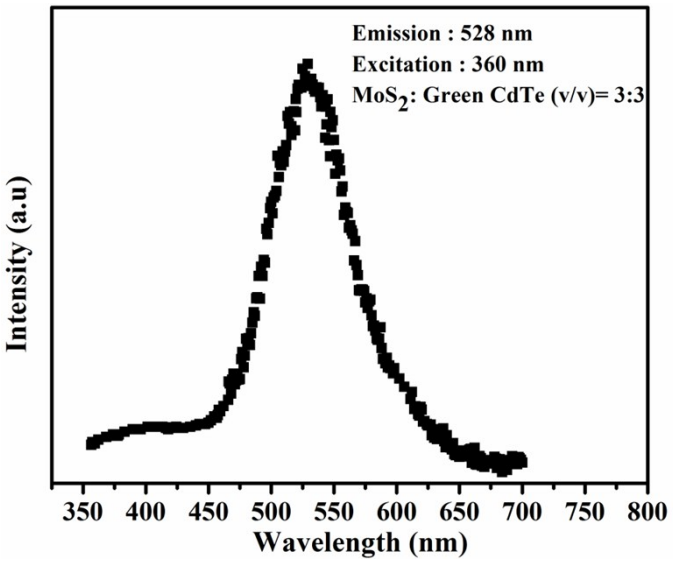

Figure S13: Photoluminescence emission spectra of MoS_2:Green CdTe =3:3 (v/v).

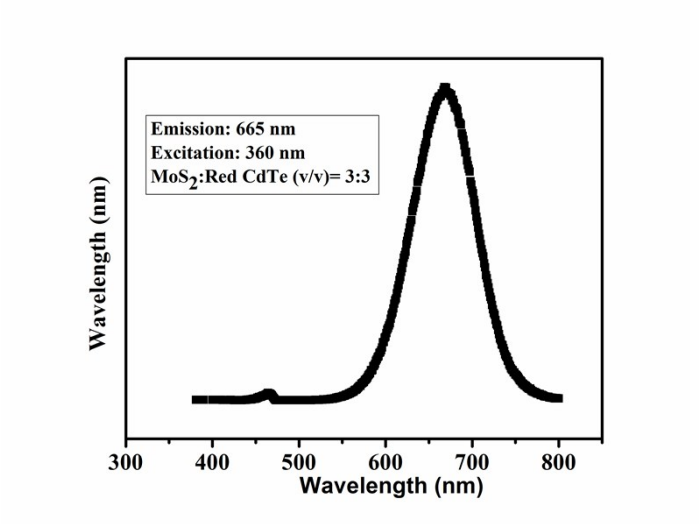

Figure S14: Photoluminescence emission spectra of MoS_2:Red CdTe =3:3 (v/v).

15. The quantum yield calculation: Relative fluorescence quantum yield of the samples are calculated according to the following expression (i)

$$\Phi s = (I_s/I_r) \times (A_r/A_s) \times (\eta_s 2/\eta_r 2) \times \Phi r \qquad \text{(i)}$$

Where the subscripts r and s refer to the reference and the sample respectively, Φ is the fluorescence quantum yield, I is the measured integrated fluorescence emission intensity, A is the optical density and η is the refractive index of the solvents.

The quantum yield of MoS_2, CdTe and hybrid materials are 14.77%, 76.08% and 63.12% respectively in which it is found that the quantum yield of the hybrid materials is much greater than MoS_2 QDs, and comparable to that of CdTe.