Supporting Information

Improved photovoltaic performance of quantum dot sensitized solar cells using multi layered semiconductors with the effect of ZnSe passivation layer

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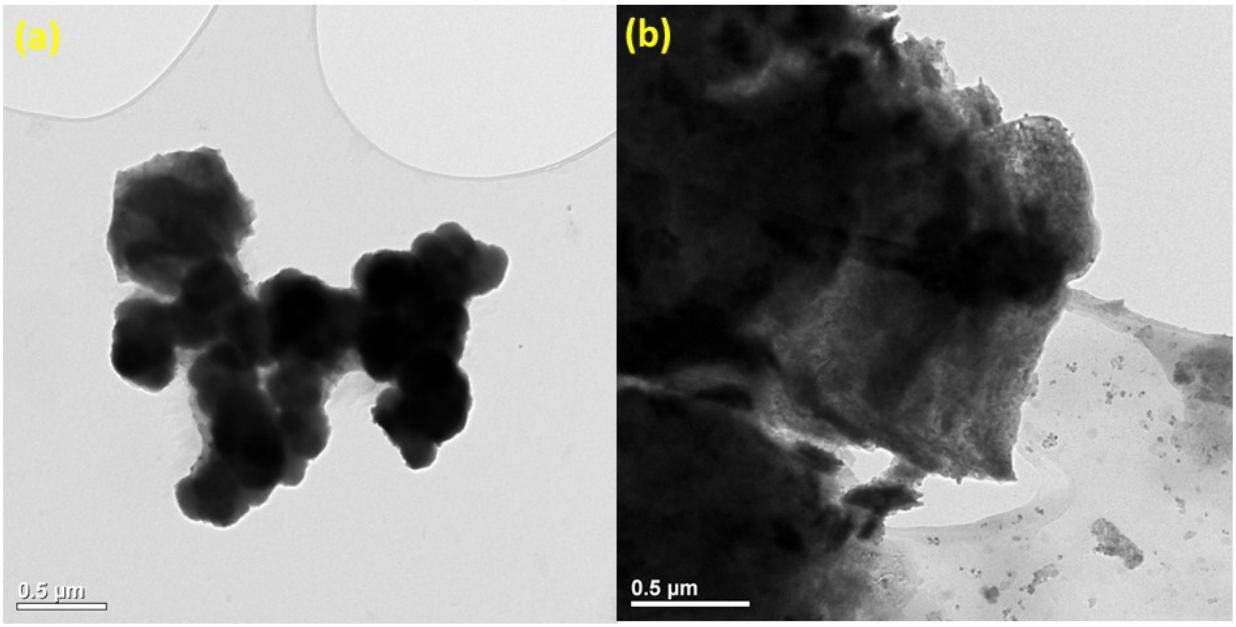

Fig. S1 TEM images of (a) PbS/CdS/CdSe/ZnS and (b) PbS/CdS/CdSe/ZnSe sensitized TiO_2 film.

From the band gap, the possible electron transfer mechanism in the photo-anode is expected using the previous reports [1, 2] and schematically depicted in Fig. S1.The low band gap of bulk PbS shows an inability of electron transfer to the conduction band of the semiconductor photo-anode i.e., the conduction band position of PbS is much lower than that of semiconductor. But in case of PbS quantum confinement the conduction band of PbS tend to an upshift, allowing the fast electron into the semiconductor photo-anode. [3-5] Furthermore, the band position of bulk PbS, CdS and CdSe shows a type-I band structure, when the materials were brought into direct contact, the band edges reorganize due to Fermi level alignment and forms a type-II band structure. [6-8]

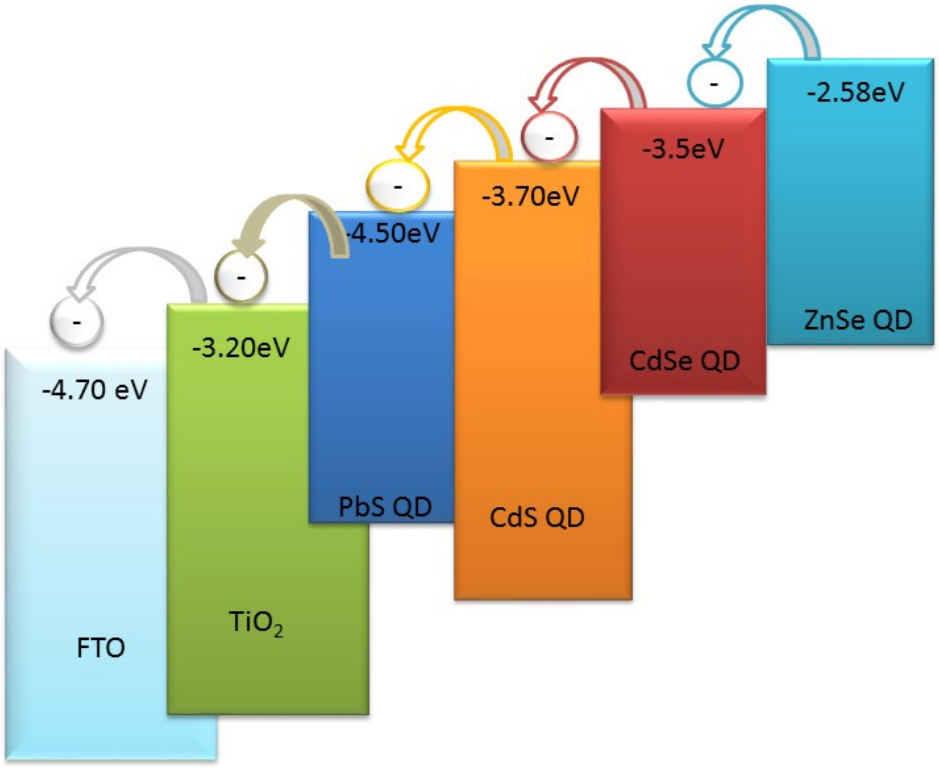

Fig. S2 Schematic representation of the energy band gap alignment of PbS/CdS/CdSe/ZnSe sensitized TiO_2 films

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