Supporting information

N-ion-implanted TiO_2 photoanodes in quantum dot-sensitized solar cells

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S1. Estimation of N ion implantation depth profile in TiO_2 lattice

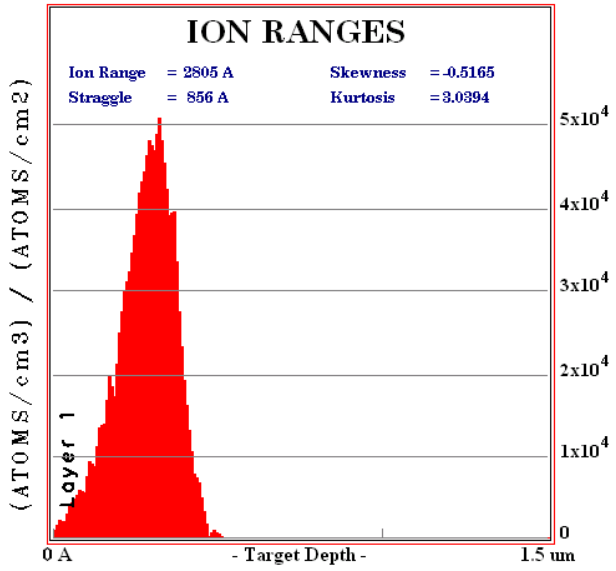

Fig. S1. SRIM2008 simulation of the depth profile of the implanted N atoms for N-H-TiO_2 electrode.

S2. XPS survey

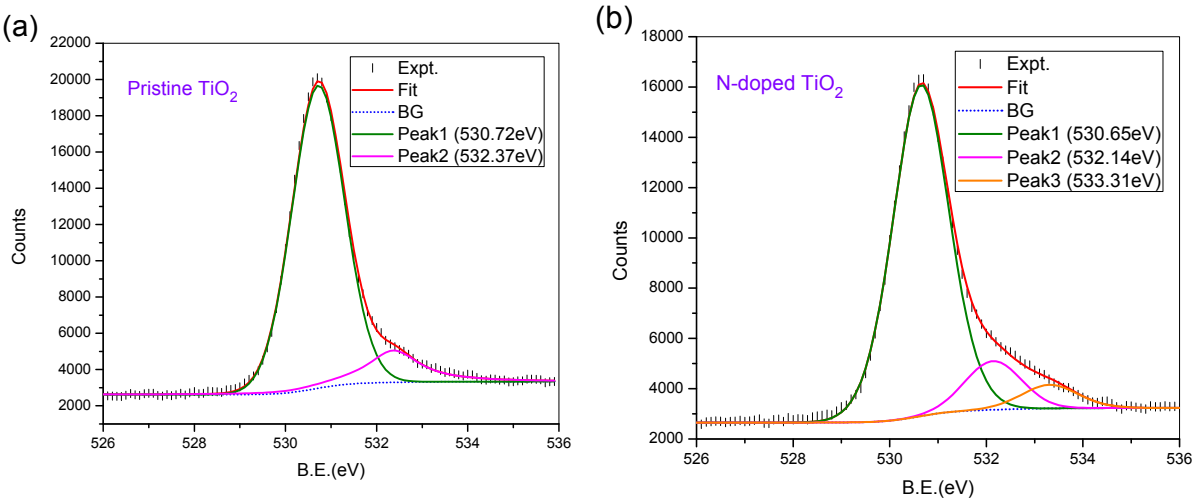

Fig. S2. C1s core level spectra of pristine and N ion implanted TiO_2

Table S1. Peak positions of Ti2p and O1s estimated from XPS spectra.

Sample	$Ti2p_{3/2}$ (eV)	$O1_s$ (main) (eV)	$O1_s$ (shoulder) (eV)	
TiO_2	459.5	530.7	532.4	-
N-TiO_2	459.3	530.7	532.1	533.3

Fig.S2 displays the O1s core level spectra of TiO_2 and N-TiO_2 samples. From Fig.S2 it observed that intensity of O1s main feature at 530.7 eV decreased by N ion implantation which endorse the occupancy of N ions in the oxygen vacancies. On the other hand feature at around 533 eV seems to slightly increase may due to OH group adsorption assumed as surface contamination.

S3. Optical absorption of QDs sensitized electrodes

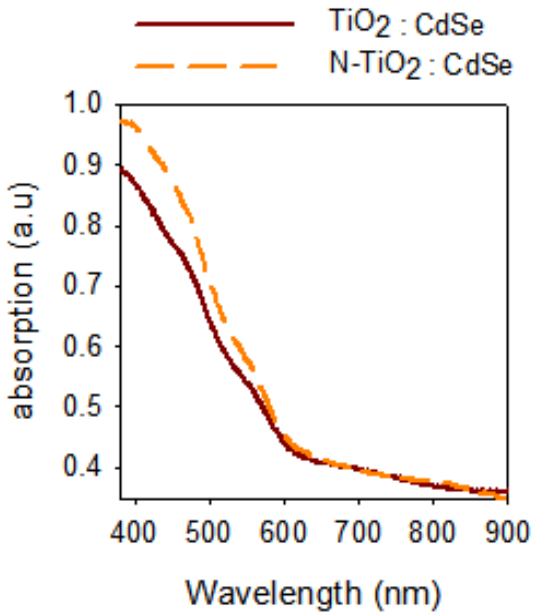

Fig. S3. Optical absorption spectra of CdSe QDs sensitized H-TiO_2 electrodes.

Fig. S3. Illustrates the absorption spectra of CdSe sensitized electrodes. From Fig.S3 the absorption onset is observed around at 580-600nm which reflects the CdSe band gap nature. Under similar CdSe sensitization conditions, the N- TiO_2 electrode show higher absorption than that of the TiO_2. We claim that the visible light is apparently improvement by synergetic contributing from N ion implantation associate with CdSe QDs.

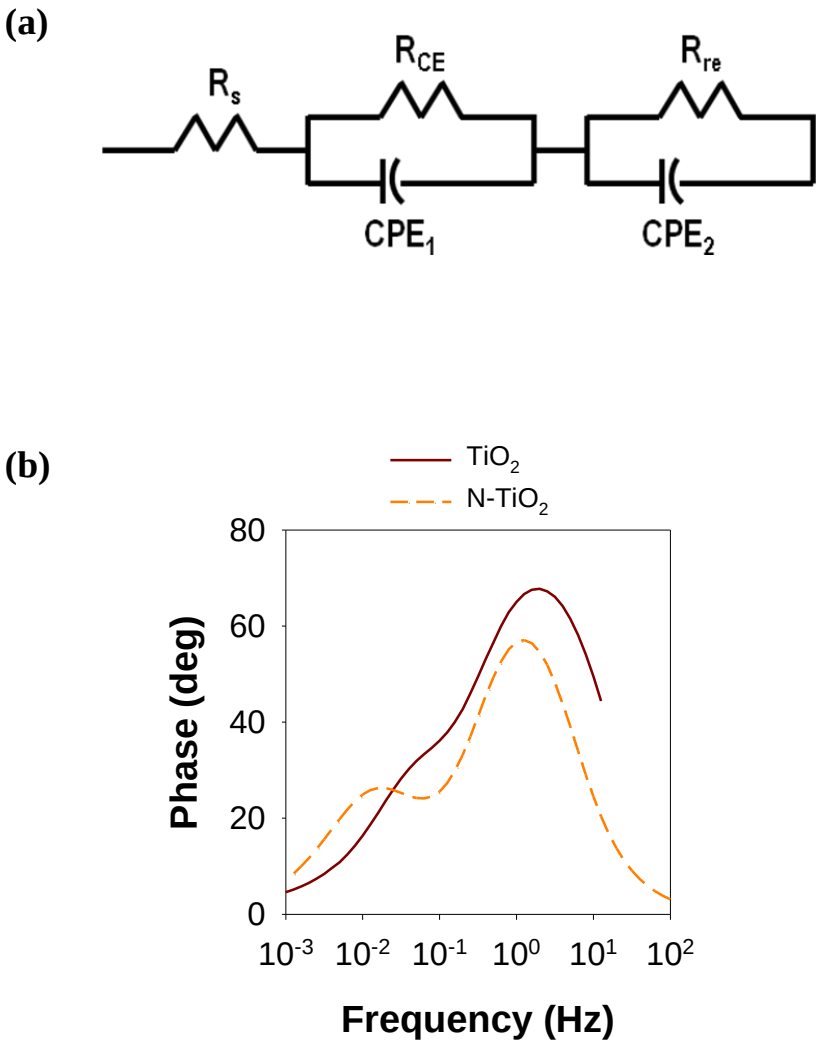

Fig. S4. (a) Equivalent circuit for impedance data analysis and (b) Bode characteristic plots of QDSCs with different photoanodes.