

Electronic Supplementary Information (ESI)

Alumina anchored CQDs/TiO₂ nanorods by atomic layer deposition for efficient photoelectrochemical water splitting under solar light

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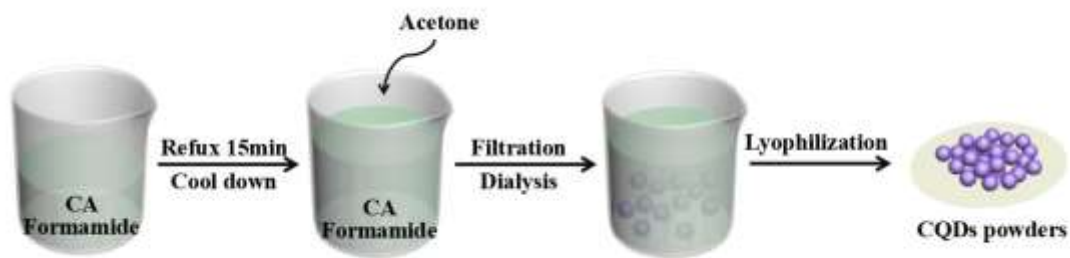


Fig. S1 The schematic diagram of the preparation process of carbon quantum dots (CQDs).

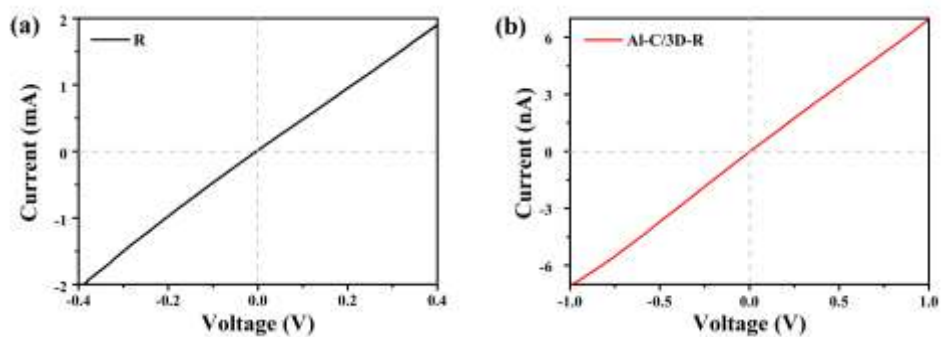


Fig. S2 *I-V* characteristics between FTO substrate and (a) TiO_2 NRs (R) and (b) Al_2O_3 -CQDs/3D- TiO_2 NRs (Al-C/3D-R).

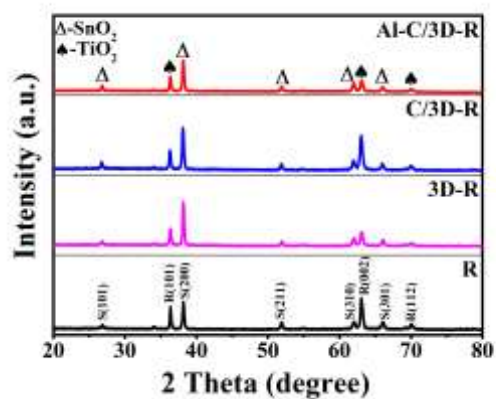


Fig. S3 XRD patterns of Rutile TiO_2 NRs (R); 3D- TiO_2 NRs (3D-R); CQDs/3D- TiO_2 NRs (C/3D-R) and CQDs/3D- TiO_2 NRs with 5 nm Al_2O_3 layer (Al-C/3D-R).

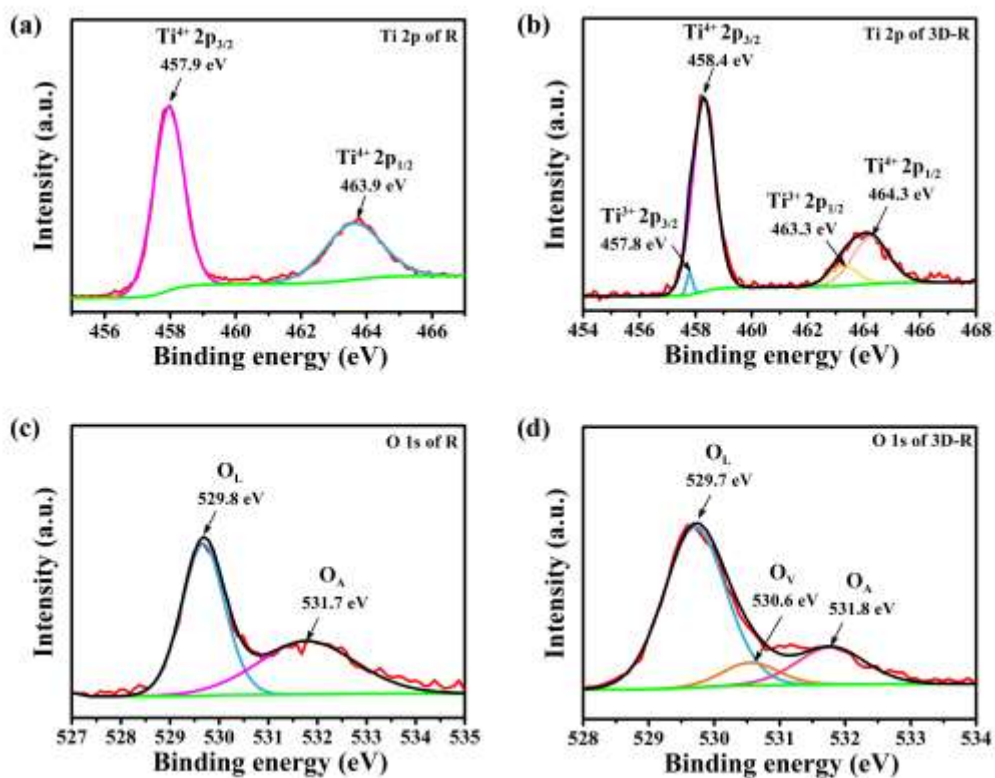


Fig. S4 High resolution XPS spectra of Ti 2p (a, b) and O 1s (c, d) of TiO₂ NRs (R) and 3D-TiO₂ NRs (3D-R).

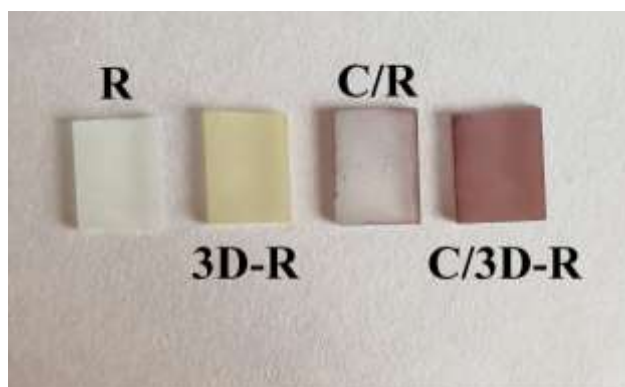


Fig. S5 Pictures of TiO₂ NRs (R), 3D-TiO₂ NRs (3D-R), CQDs/TiO₂ NRs (C/R) and CQDs/3D-TiO₂ NRs (C/3D-R) from left to right.

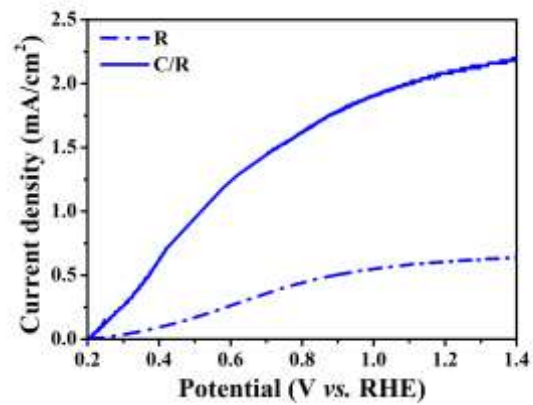


Fig. S6 *J-V* curves of TiO₂ NRs (R) and CQDs/TiO₂ NRs (C/R).

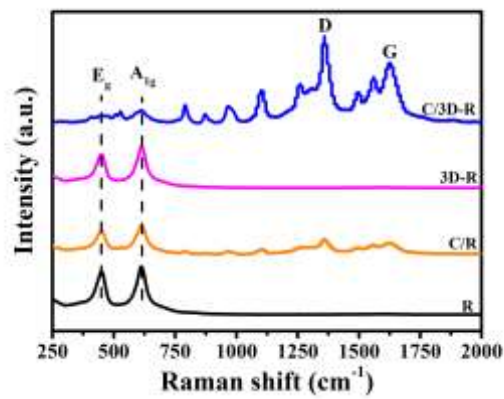


Fig. S7 Raman spectra of TiO₂ NRs (R), 3D-TiO₂ NRs (3D-R), CQDs/TiO₂ NRs (C/R) and CQDs/3D-TiO₂ NRs (C/3D-R).

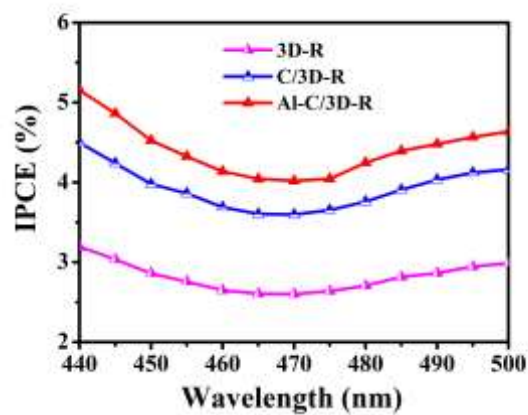


Fig. S8 IPCE spectra (from 440 nm to 500 nm) of 3D-TiO₂ NRs (3D-R); CQDs/3D-TiO₂ NRs (C/3D-R) and CQDs/3D-TiO₂ NRs with 5 nm Al₂O₃ layer (Al-C/3D-R).

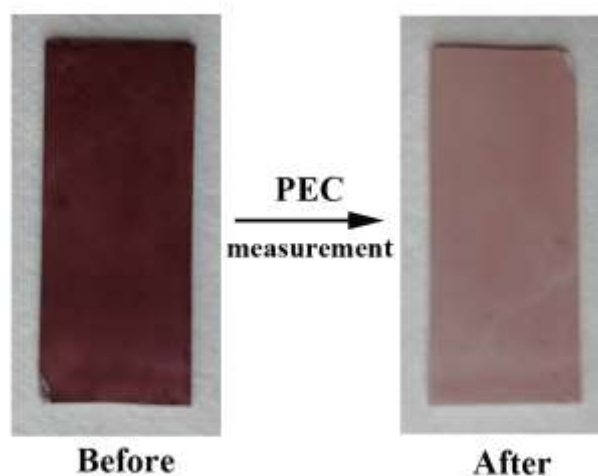


Fig. S9 The color change of CQDs/3D-TiO₂ NRs nanocomposites before and after PEC measurements.

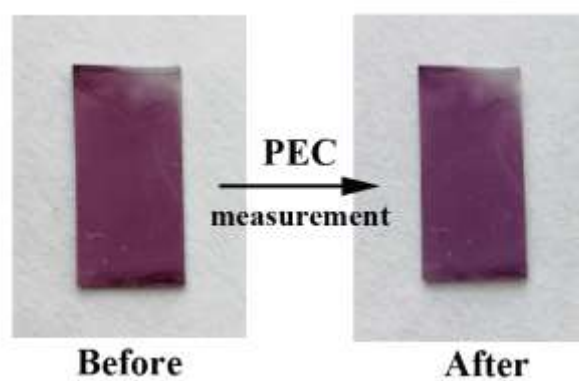


Fig. S10 The color change of Al₂O₃-CQDs/3D-TiO₂ NRs nanocomposites before and after PEC measurements.

C [%]	O [%]	N [%]	H [%]
45.34	34.28	16.72	3.66

Table S1 Element analysis of CQDs.