Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A


# Electronic Supplementary Information

# Carbon quantum dots/$TiO_2$ composites for efficient photocatalytic hydrogen evolution

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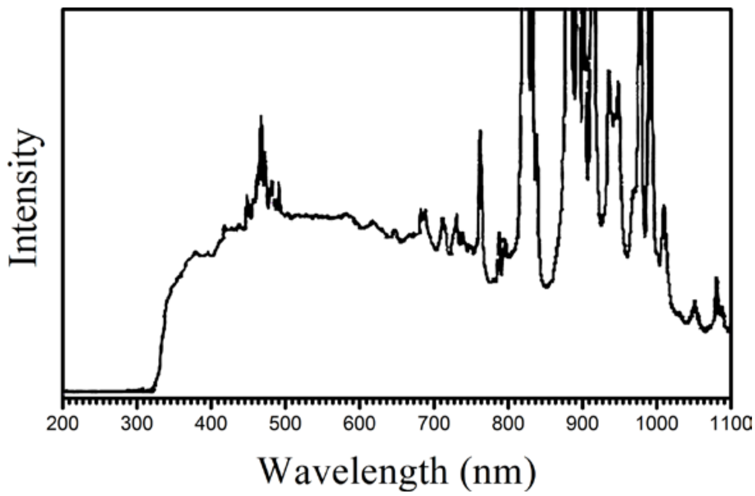


Fig. S1 The light spectrum of Xenon lamp.

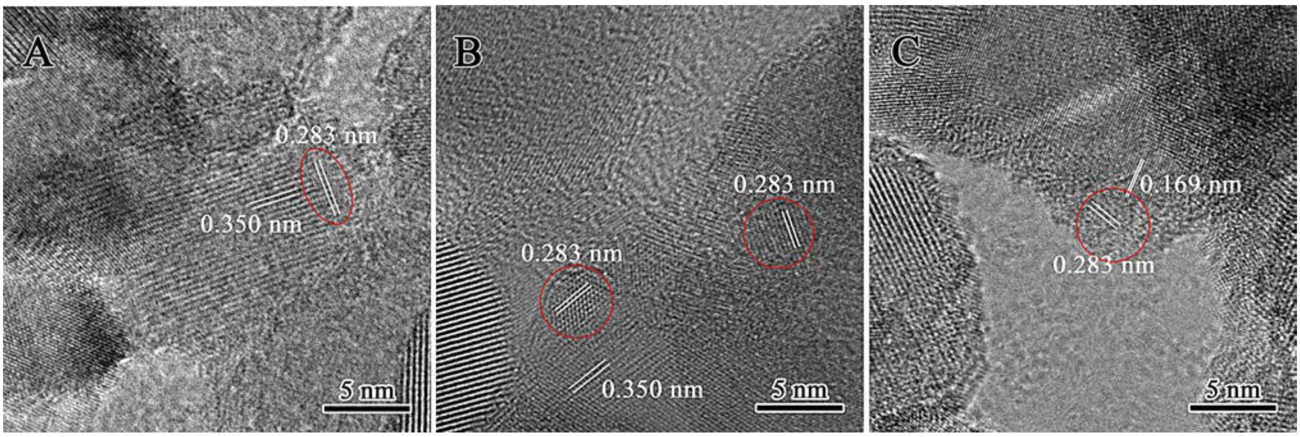


Fig. S2 HRTEM images of CQDs/P25-1.5wt% (A), CQDs/P25-2.0wt% (B) and CQDs/P25-2.5 wt% (C).

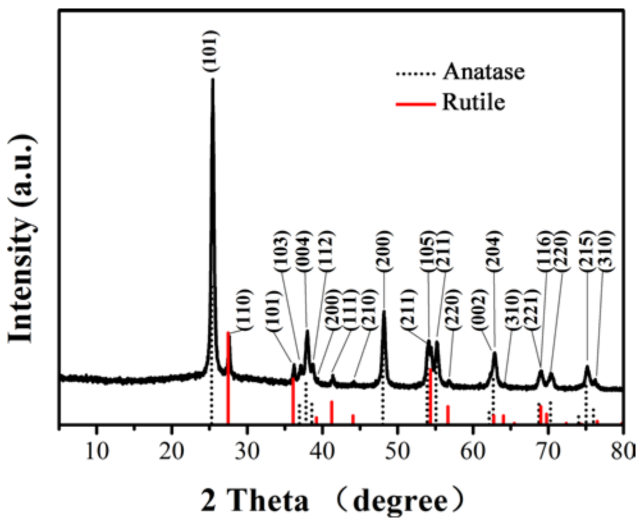


Fig. S3 XRD pattern of CQDs/P25-1.5wt%.

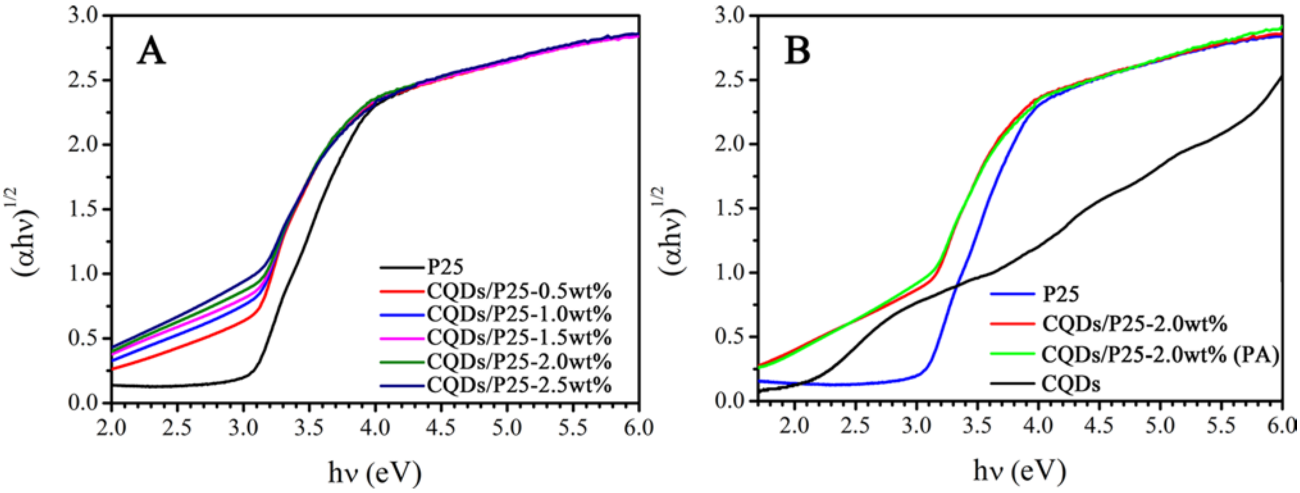


Fig. S4 (A) Band gap estimation based on the Kubelka-Munk function for P25 and CQDs/P25 composites with different amount of CQDs; (B) Band gap estimation based on the Kubelka-Munk function for P25, CQDs, CQDs/P25-2.0wt% prepared by the hydrothermal method, and CQDs/P25-2.0wt% obtained by the physical adsorption (PA).

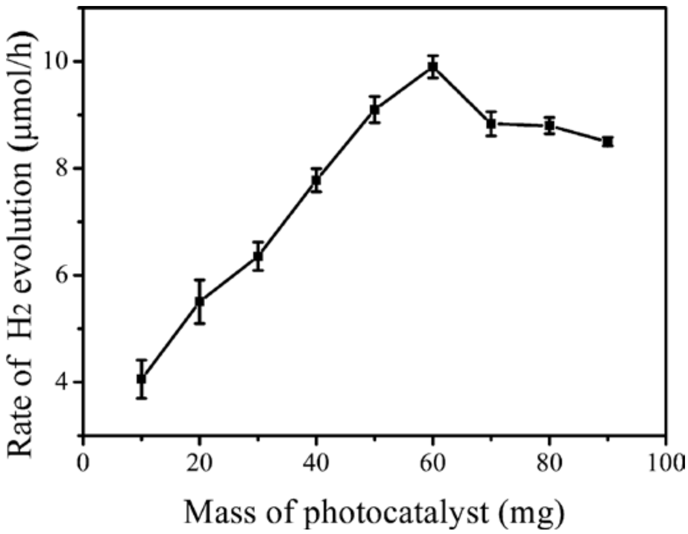


Fig. S5 The effect of amount of photocatalysts on the photocatalytic $H_2$ evolution rate over CQDs/P25-1.5wt% under UV-Vis irradiation in methanol aqueous solution ($V_{methanol}$:$V_{water}$=1:3).

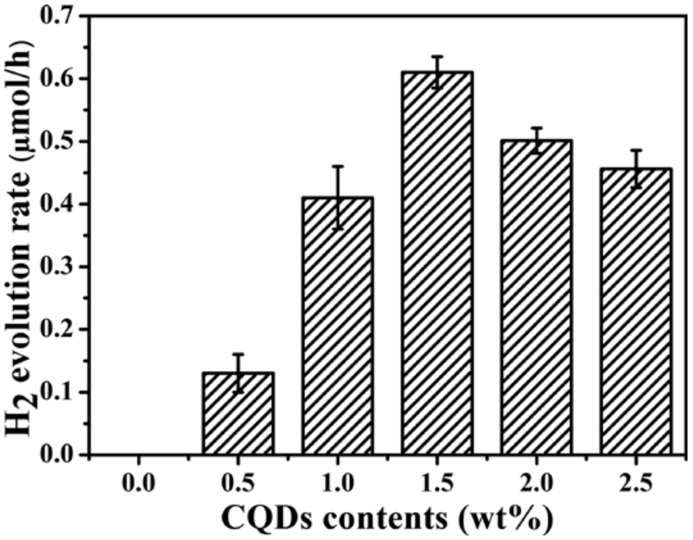


Fig. S6 Photocatalytic $H_2$ evolution rates of pure P25 and CQDs/P25 composites with different amount of CQDs under UV-Vis light irradiation in pure water without methanol.

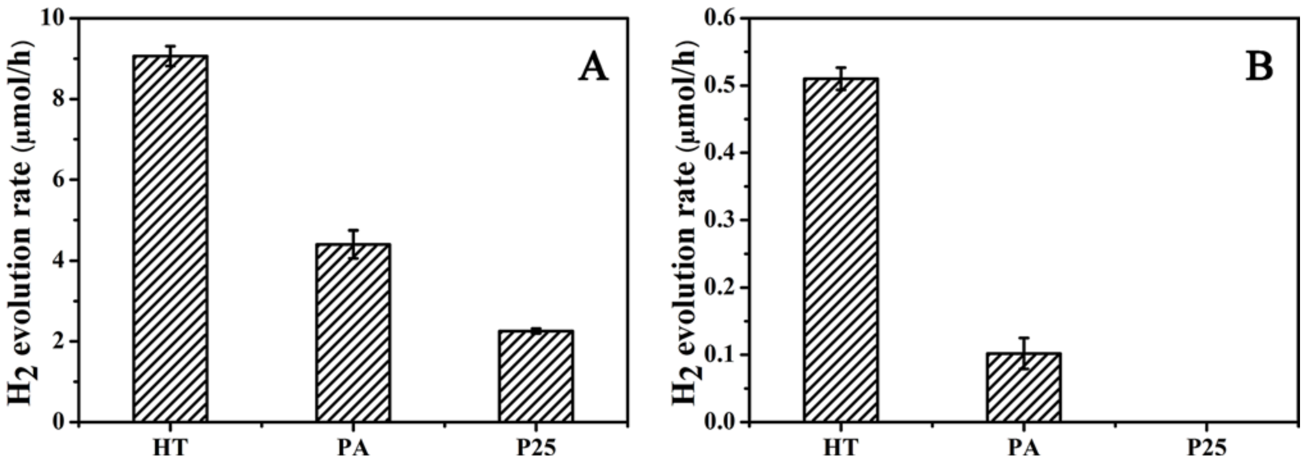


Fig. S7 Photocatalytic $H_2$ production activities of pure P25 and CQDs/P25 composites prepared by the hydrothermal method (HT) and the physical adsorption (PA) under (A) UV-Vis and (B) visible light (λ >450 nm) irradiation in methanol aqueous solution.

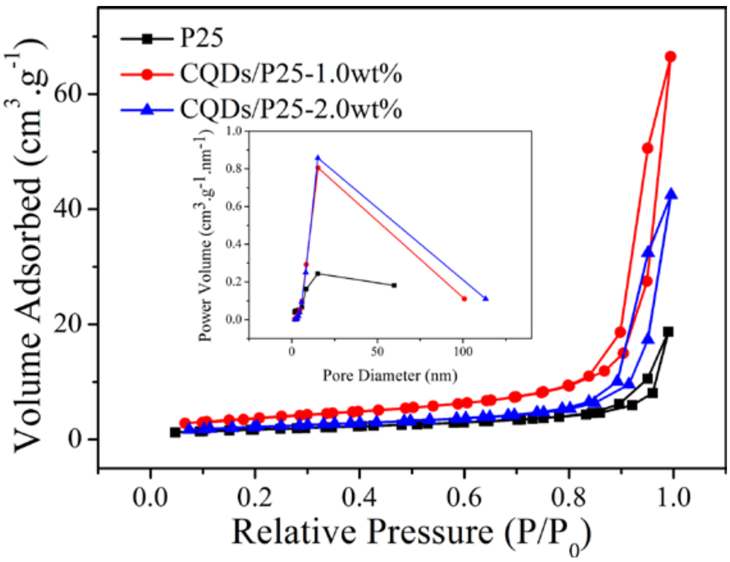


Fig. S8 BET measurements of P25, CQDs/P25-1.0wt% and CQDs/P25-2.0wt%. Inset: the pore size distribution of P25, CQDs/P25-1.0wt% and CQDs/P25-2.0wt%.

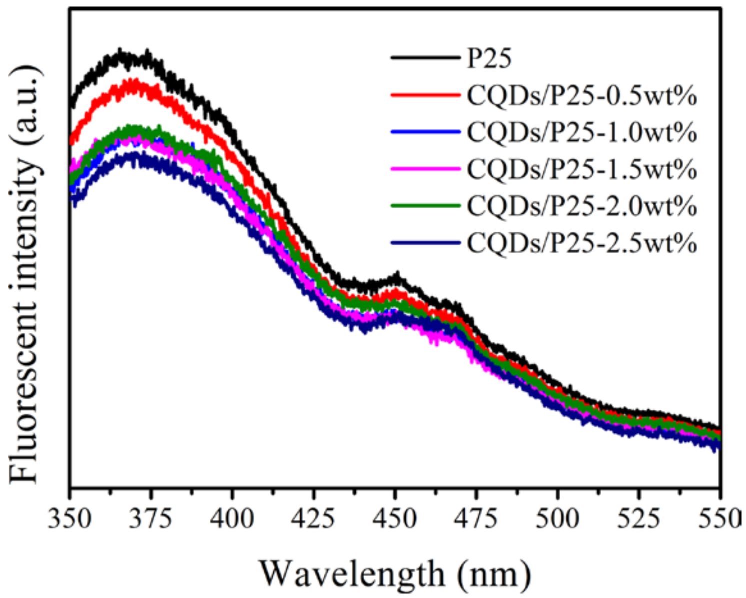


Fig. S9 Photoluminescence spectra of P25 and CQDs/P25 composites with different amount of CQDs under the excitation of 305 nm.

Table S1 Surface analysis data of pure P25, CQDs/P25-1.0wt% and CQDs/P25-2.0wt%

| **Sample** | **BET specific surface area ($m^2$ $g^{-1}$)** | **Average pore diameter (nm)** | **Pore volume ($cm^3$ $g^{-1}$)** |
|---|---|---|---|
| P25 | 59.5 | 15.2 | 0.259 |
| CQDs/P25-1.0wt% | 56.2 | 15.4 | 0.423 |
| CQDs/P25-2.0wt% | 54.8 | 15.2 | 0.451 |

It should be noted here that P25 and CQDs are not porous materials.