Electronic Supplementary Information for

Bidentate-complexes-derived TiO$_2$/carbon dots photocatalysts: \textit{in situ} synthesis, versatile heterostructures, and enhanced H$_2$ evolution

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Fig. S1 PL distribution maps of pure CDs solutions obtained at (a) 90 \degree C, 2 h, (b) 90 \degree C, 6 h, (c) 150 \degree C, 2 h, (d) 150 \degree C, 6 h, (e) 200 \degree C, 2 h, and (f) 200 \degree C, 6 h.

Fig. S2 TGA curves of (black) pure TiO$_2$ NPs and (red) NPs/CDs composites.
Fig. S3 (a) XRD patterns of pure TiO$_2$ NPs and NPs/CDs nanocomposites (A indicates anatase phase, R is the rutile phase, and the * denotes the peaks from the sample stage), and (b) the bare sample stage.

Fig. S4 SEM image of the as-prepared TiO$_2$ nanowires.
Fig. S5 XRD patterns of the as-prepared TiO$_2$ nanowires.

Fig. S6 FT-IR spectra of TiO$_2$ NPs, VC and NPs/VC complexes at various VC amounts.

Fig. S7 TEM images of NPs/CDs composites (obtained at VC amount of 1.1 g) at (a) low and (b) high magnification.
Fig. S8 PL distribution maps of the CDs from NWs/CDs nanocomposites obtained at 90 °C for (a) 2 h, (b) 4 h and (c) 6 h.

Fig. S9 Photocatalytic H₂ production studies of TiO₂ NPs and hydrothermally treated TiO₂ NPs for 2 and 4 h, respectively.

Fig. S10 Time course of H₂ production from TiO₂ NPs and the mixture of TiO₂ NPs and CDs (the CDs were obtained at 90 °C for 4 h).