Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

Supporting Information (SI)

For

Facile Preparation of Monodisperse, Carbon Doped Single Crystal Rutile TiO_2 Nanorod Spheres with Large Percentage Reactive [110] Facet Exposure for High Efficient H_2 Generation

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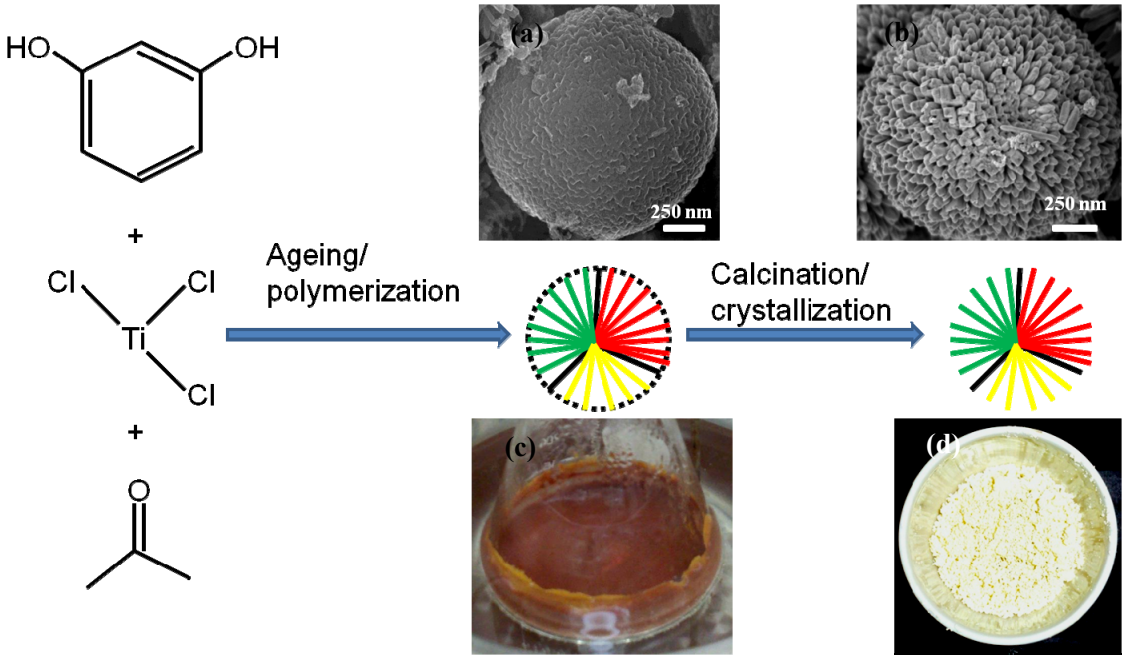
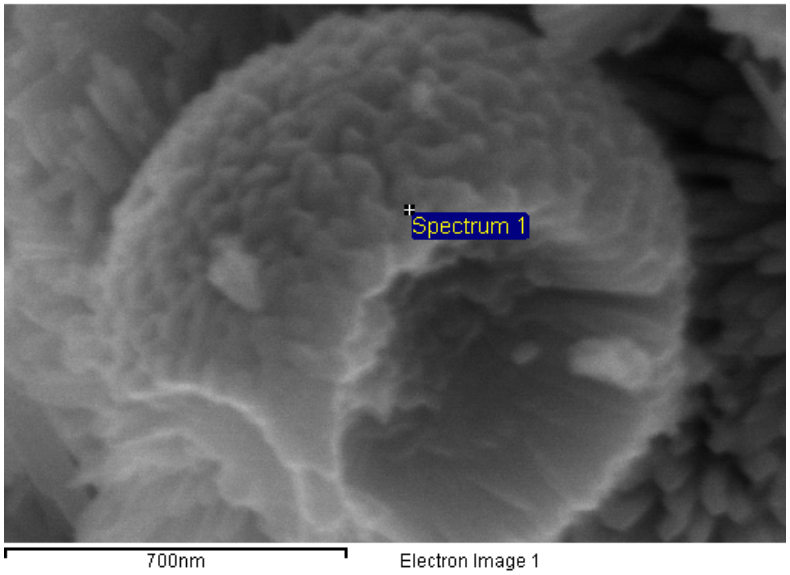
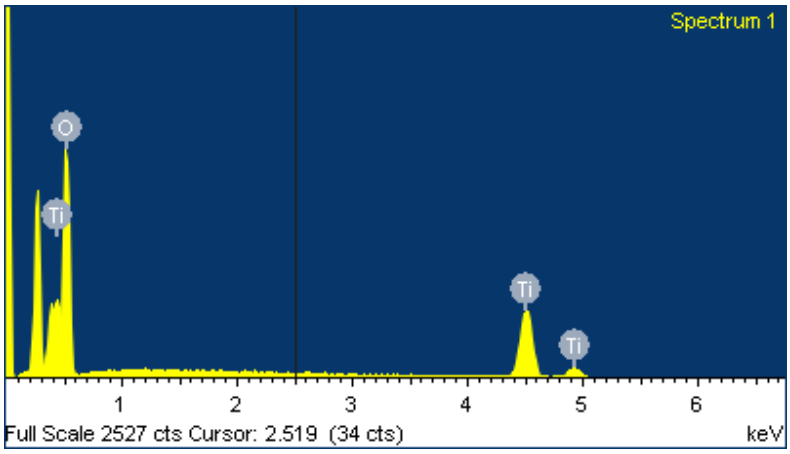


Figure S1. The formation route of TiO_2 nanorod spheres. Under continuous stirring condition, well mixed $TiCl_3$, resorcinol and formaldehyde was reacted for 2 h at 90 °. In the polymerization process, resorcinol and formaldehyde were well cross-linked together forming into RF spheres as shown in Figure 1S, Ti^{3+} reacted with oxygen in the solution forming TiO_2 and grew along (001) with Cl^- acting as a crystallographic controlling agent. Then TiO_2 nanorods were wrapped up by RF spheres forming into crescent Ti/RF spheres (Figure S1a)(Figure S1c is the corresponding bulk photo). In the crystallization process, residual organics were burned off, while the TiO_2 nanorod spheres formed (Figure S1b)(Figure S1d is the corresponding bulk photo, from which we know the TiO_2 nanorod spheres look light yellow)





Element	Weight%	Atomic%
O K	39.45	66.11
Ti K	60.55	33.89
Totals	100.00	

Figure S2. EDS spectrum of TiO_2 nanorod sphere and its stoichiometric composition, the atomic ratio of Ti: O is exactly 1:2, in consistent with its theoretical value.

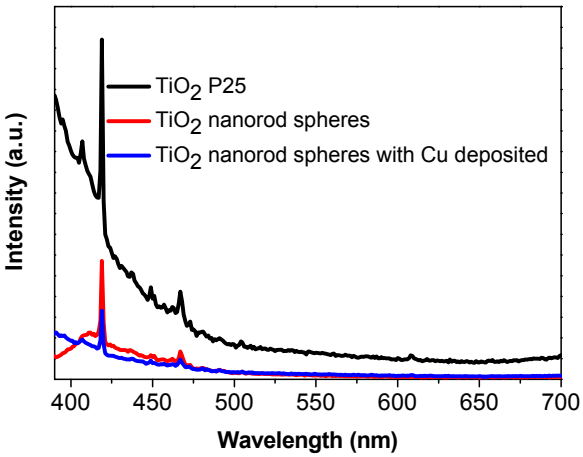


Figure S3. Photoluminescence spectrum of the TiO_2 nanorod spheres with Cu deposited, TiO_2 nanorod spheres and TiO_2 P25. From the PL spectrum of TiO_2 nanorod spheres and the TiO_2 nanorod spheres with Cu deposited, it is obvious that the electrons transfer between TiO_2 and Cu was enhanced by the deposition of Cu on the surface of TiO_2 nanorods. This is beneficial for the photocatalytic H_2 generation.

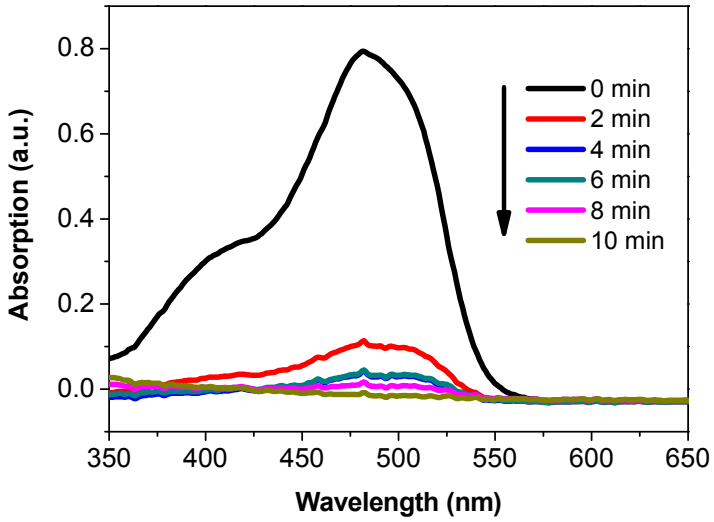


Figure S4. Absorption spectra of AO 7 solution at different time after irradiating with UV light and using TiO_2 P25 as the reference photocatalyst

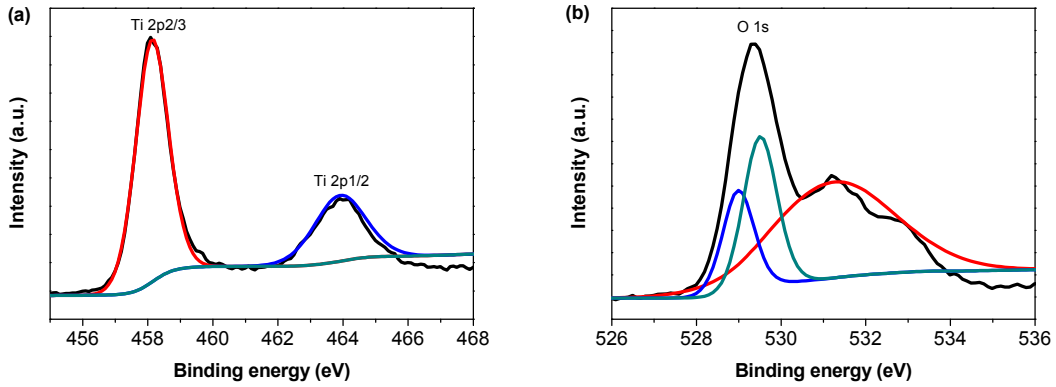


Figure S5. High resolution XPS spectrum of a) Ti 2p and b) O 1s of the TiO_2 nanorod spheres with Cu deposited.

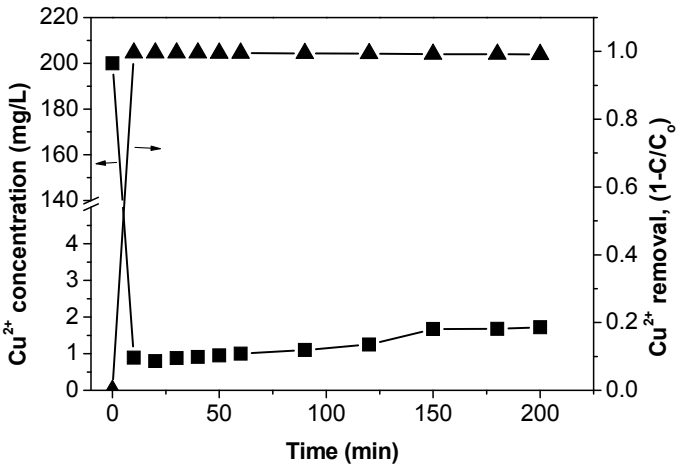


Figure S6. The Cu^{2+} concentration against the reaction time in the simultaneous Cu^{2+} removal and H_2 generation process under the irradiation of UV light and the corresponding removal rate of Cu^{2+} from the solution