

Electronic Supplementary Information (ESI) available for:

**Hunting for a maximum highly-energetic facet that interplays
with spatial charge storage for enhanced catalytic activity**

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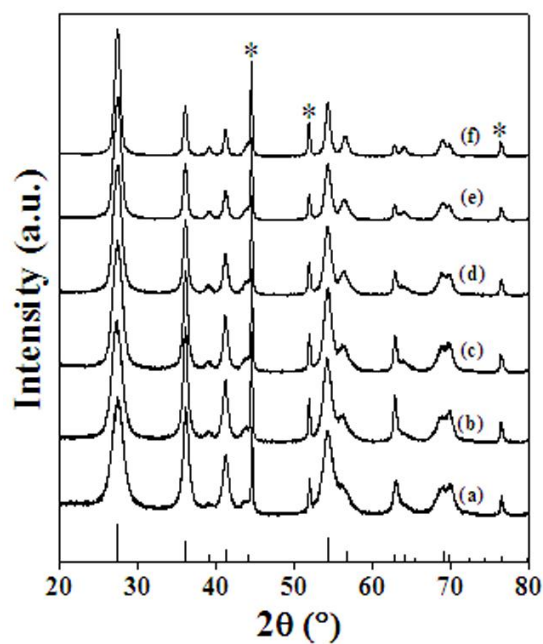
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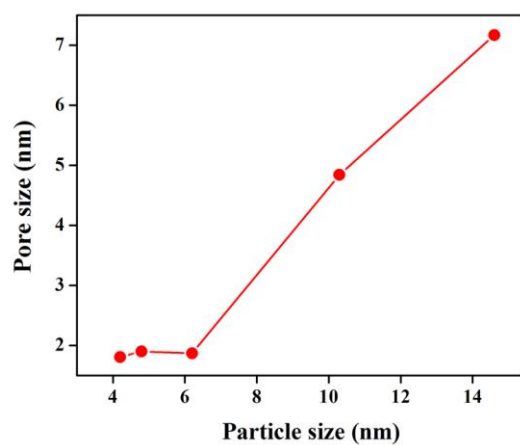
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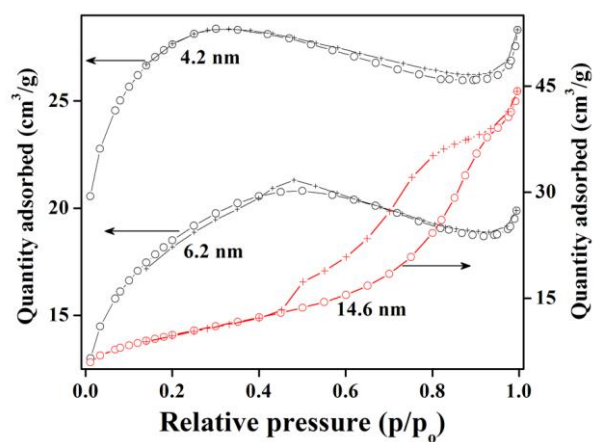
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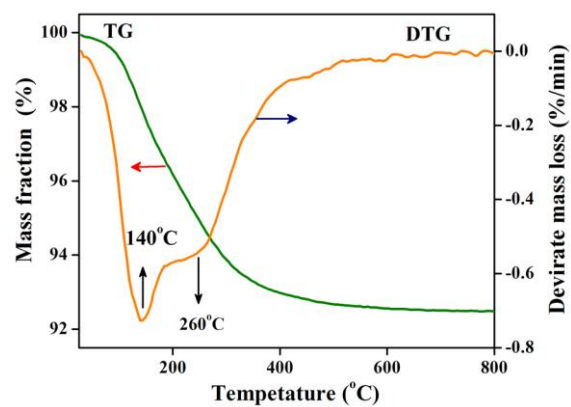
S1 XRD patterns of the rutile TiO_2 microspheres synthesized at 160°C for different period of reaction time: (a) 1 h, (b) 1.5 h, (c) 2 h, (d) 2.5 h (e) 4 h and (f) 8 h. Vertical bars represent the standard diffraction data of bulk rutile TiO_2 . Symbol * represents the diffraction lines of internal standard nickel.



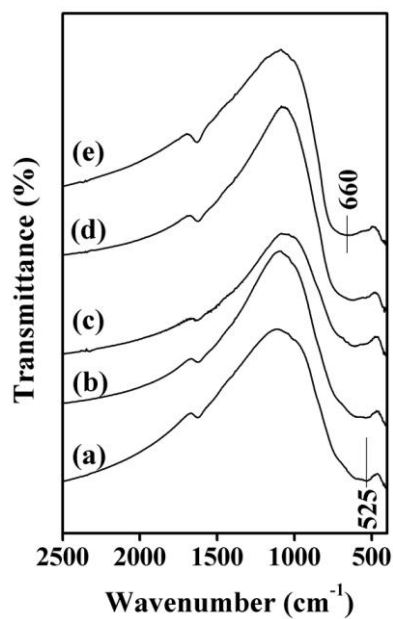
S2 Pore size as a function of the diameters of constructing nanowires within TiO₂ microspheres.



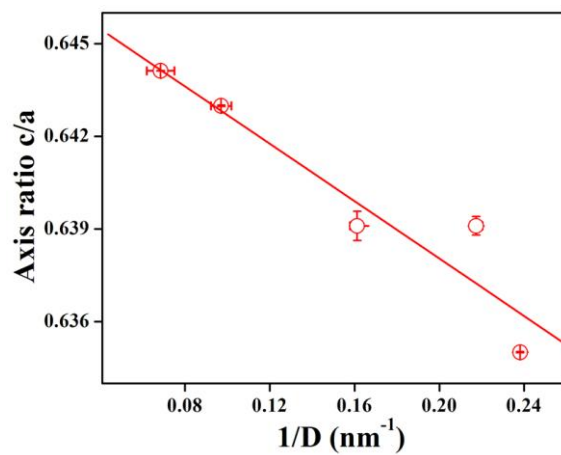
S3 Typical nitrogen adsorption and desorption isotherm curves for different diameters of the constructing nanowires of rutile TiO₂ microspheres.



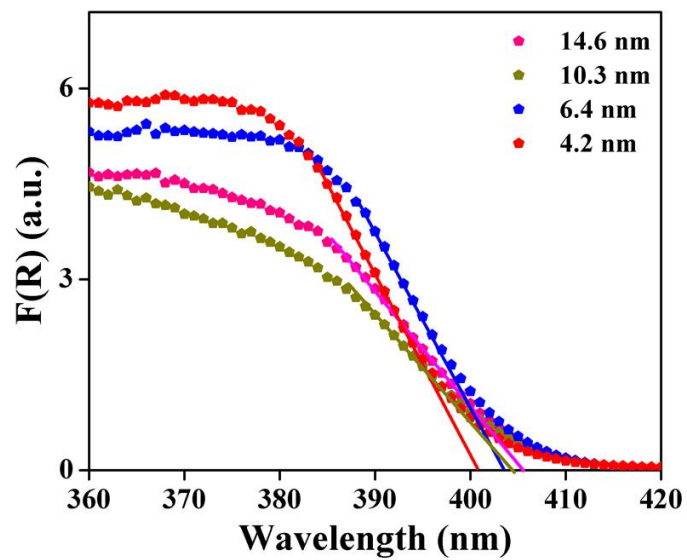
S4 TG and DTG curve for a typical nanowires diameter of 4.2 nm for rutile TiO₂ microspheres.



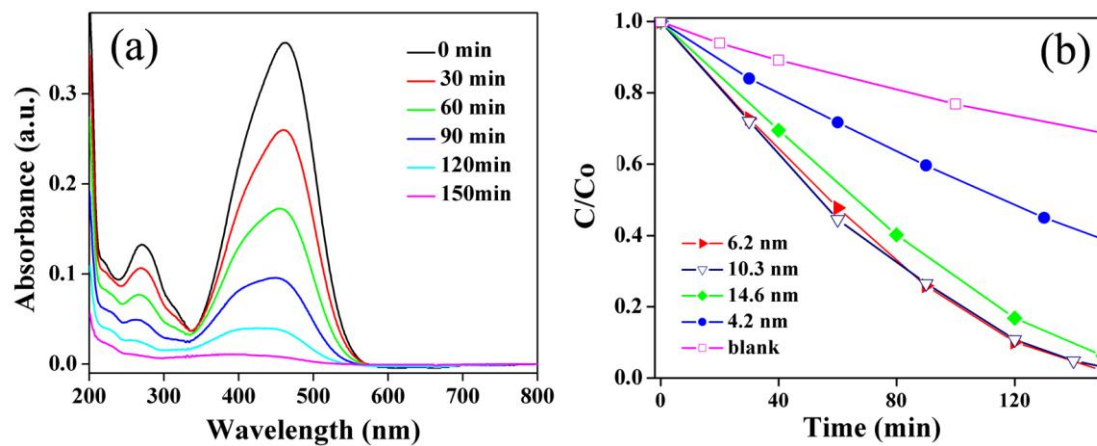
S5 FT-IR spectra that illustrate the relative shifts of the vibration for Ti-O bonding with increasing the diameters of constructing nanowires within microspheres: (a) 4.2 nm, (b) 4.8 nm, (c) 6.2 nm, (b) 10.3 nm, and (b) 14.6 nm.



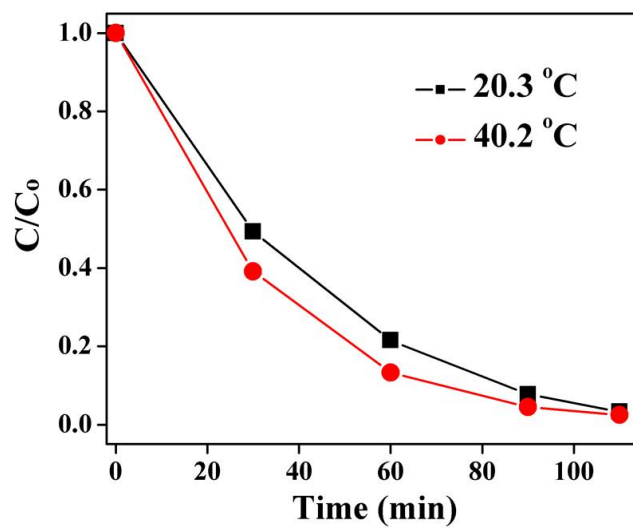
S6 Axis ratio c/a as a function of the diameters of constructing nanowires in the assembled microspheres.



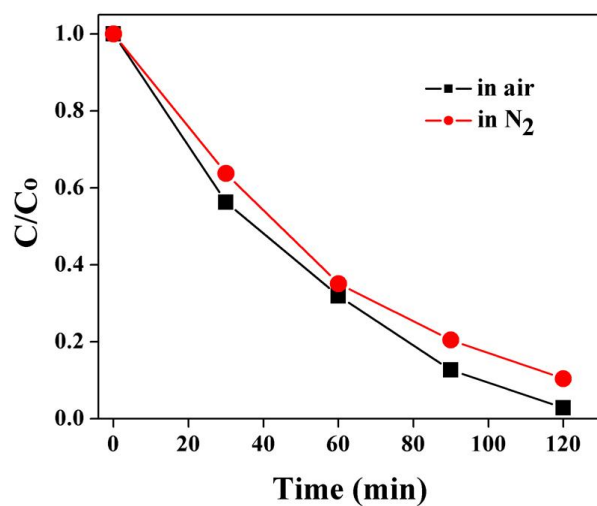
S7 Enlarged UV-vis DRS of TiO₂ microspheres with different constructing nanowires.



S8 (a) Time-dependent absorption spectra of MO solution in the presence of microspheres assembled by TiO₂ nanowires with a diameter of 6.2 nm, and (b) photocatalytic activities when irradiated by UV light at 254 nm, as indicated by normalized concentration of methyl orange versus irradiation time in the presence of TiO₂ microspheres assembled by nanowires with given diameters.



S9 Photo-degradation curve of TiO_2 microsphere with a diameter of 6.2 nm constructing nanowires under different temperature.



S10 The photo degradation curves of MO in presence of TiO₂ microsphere with a constructing diameter of 6.2 nm irradiated by 300 nm UV-Vis light at the atmosphere of air or N₂.