Electronic Supplementary Material (ESI) for Inorganic Chemistry Frontiers.

Morphologies-Controlled Synthesis of TiO_2/MoS_2 Nanocomposites for Enhanced Visible-light Photocatalytic Activities

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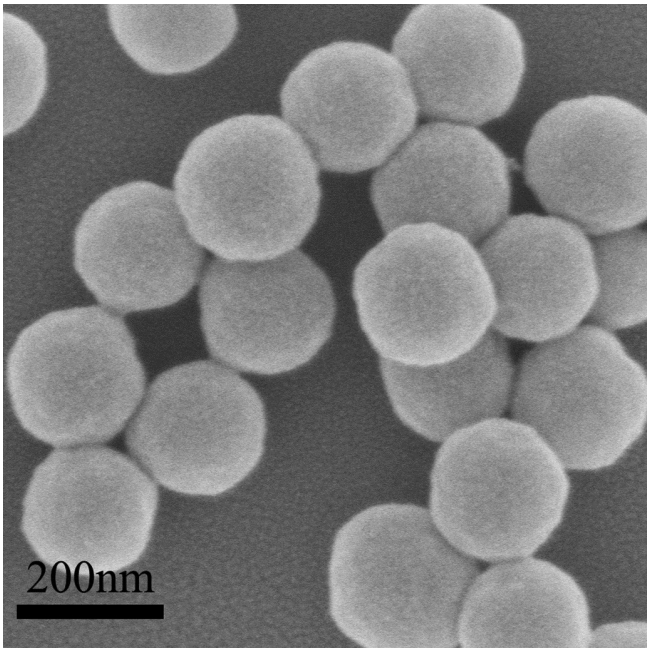

Figure S1 SEM image of TiO_2 microspheres.

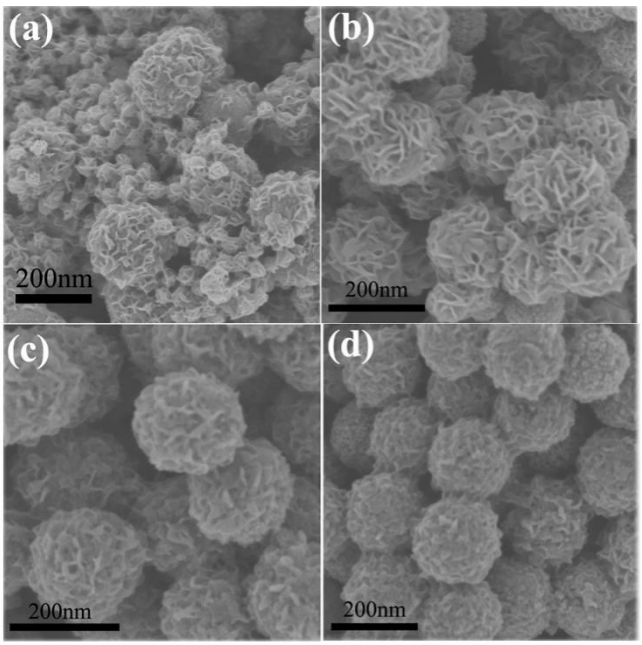

Figure S2 SEM images with different thickness of MoS_2 prepared by using various amounts of TiO_2 microspheres as seeds: (a) 1 mg·mL^{-1}; (b) 2 mg·mL^{-1}; (c) 3 mg·mL^{-1}; (d) 5 mg·mL^{-1}.

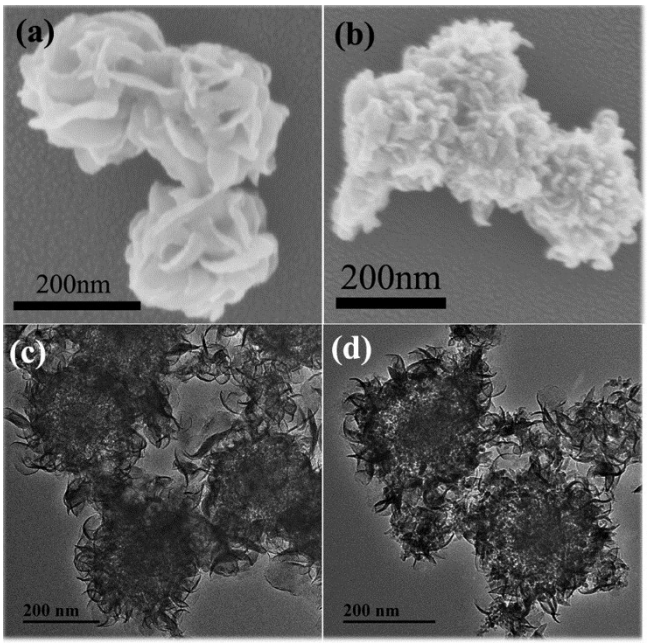

Figure S3. SEM (a, b) and TEM (c, d) images of MoS_2/TiO_2 yolk–shell structure synthesized by targeted etching for 0.5 h (a, c), 2 h (b, d), respectively.

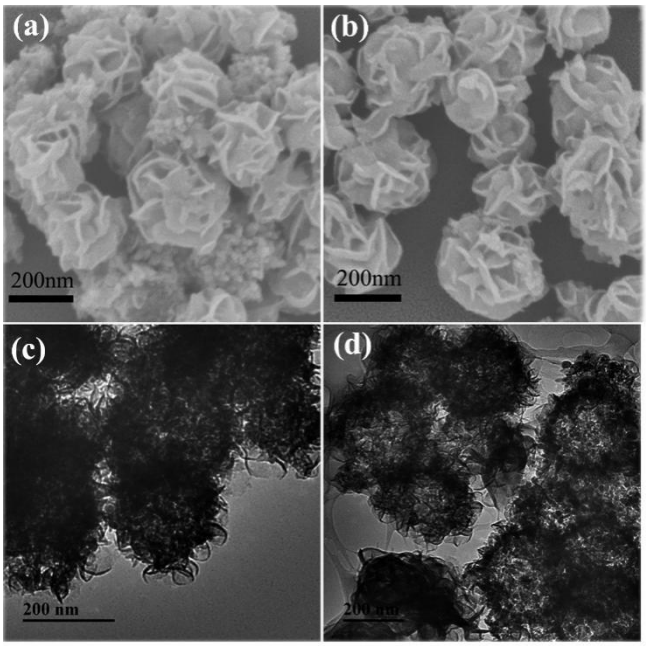

Figure S4. SEM (a, b) and TEM (c, d) images of MoS_2/TiO_2 hollow structure synthesized by targeted etching for 1 h (a, c), 3 h (b, d), respectively.

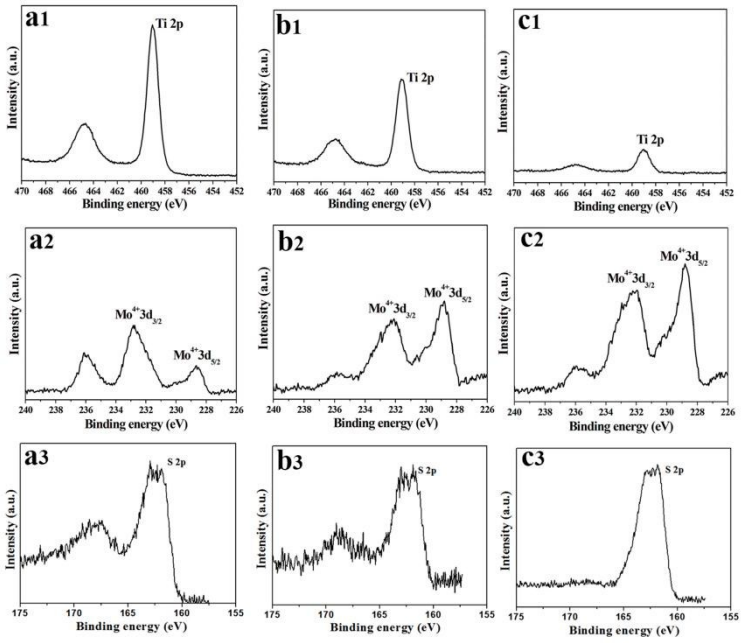

Figure S5 XPS spectra (1, Ti 2p; 2, Mo 3d and 3, S 2p) of MoS_2/TiO_2 microspheres with various morphologies: a, core−shell structure; b) yolk–shell structure; c) hollow structure.

Table S1. BET measurement and the amount of Ti in the resultant samples.

Sample	TiO_2-anatase	MoS_2	TiO_2/MoS_2	y−TiO_2/MoS_2	h−TiO_2/MoS_2

$S_{BET}(m^2/g)$	137	35	287	231	129
TiO_2 (%)			92.59	81.81	60.61

Table S2. The adsorption value and degradation rate of resultant samples towards MB

Sample	TiO_2	TiO_2-anatase	MoS_2	TiO_2/MoS_2	y−TiO_2/MoS_2	h−TiO_2/MoS_2
Adsorption value ($mg \cdot g^{-1}$)	189.7	130.4	396.6	299.97	498.5	498.5
Degradation rate (%)	27.55	60.1	67.76	84.56	93.39	98.28

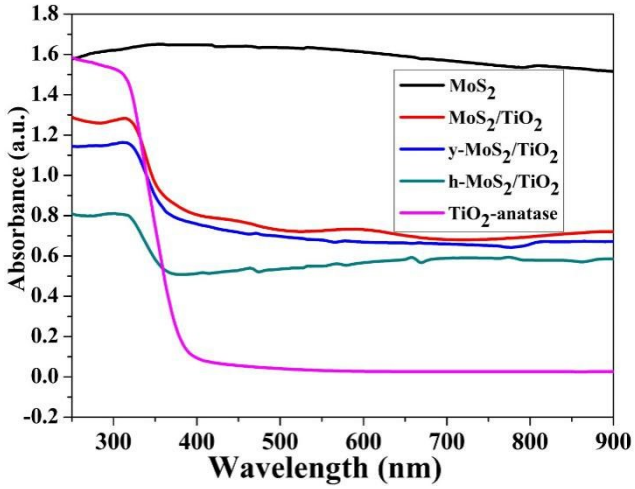

Figure S6. UV−vis absorption spectra of resultant samples.

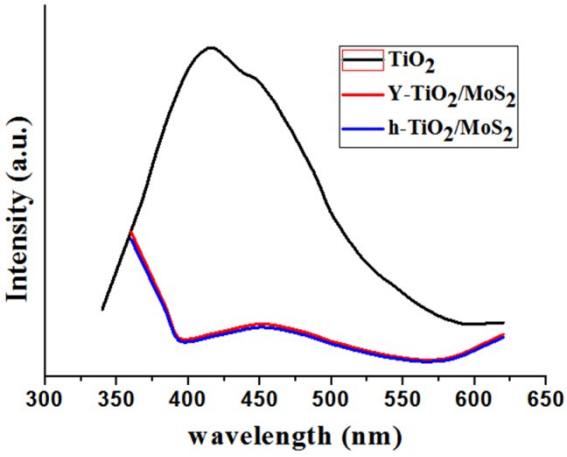

Figure S7. the photoluminescence spectra of TiO_2, h-TiO_2/MoS_2 and y-TiO_2/MoS_2

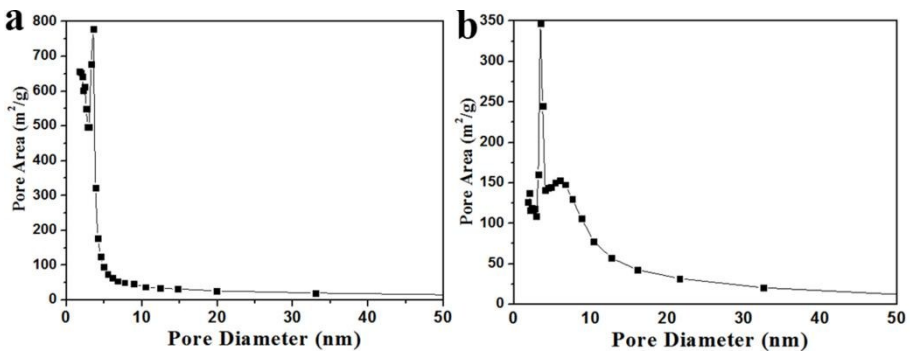

Figure S8. pore-size distribution curves of MoS_2/TiO_2 heterostructures with various morphologies: a,) yolk–shell structure and b) hollow structure.

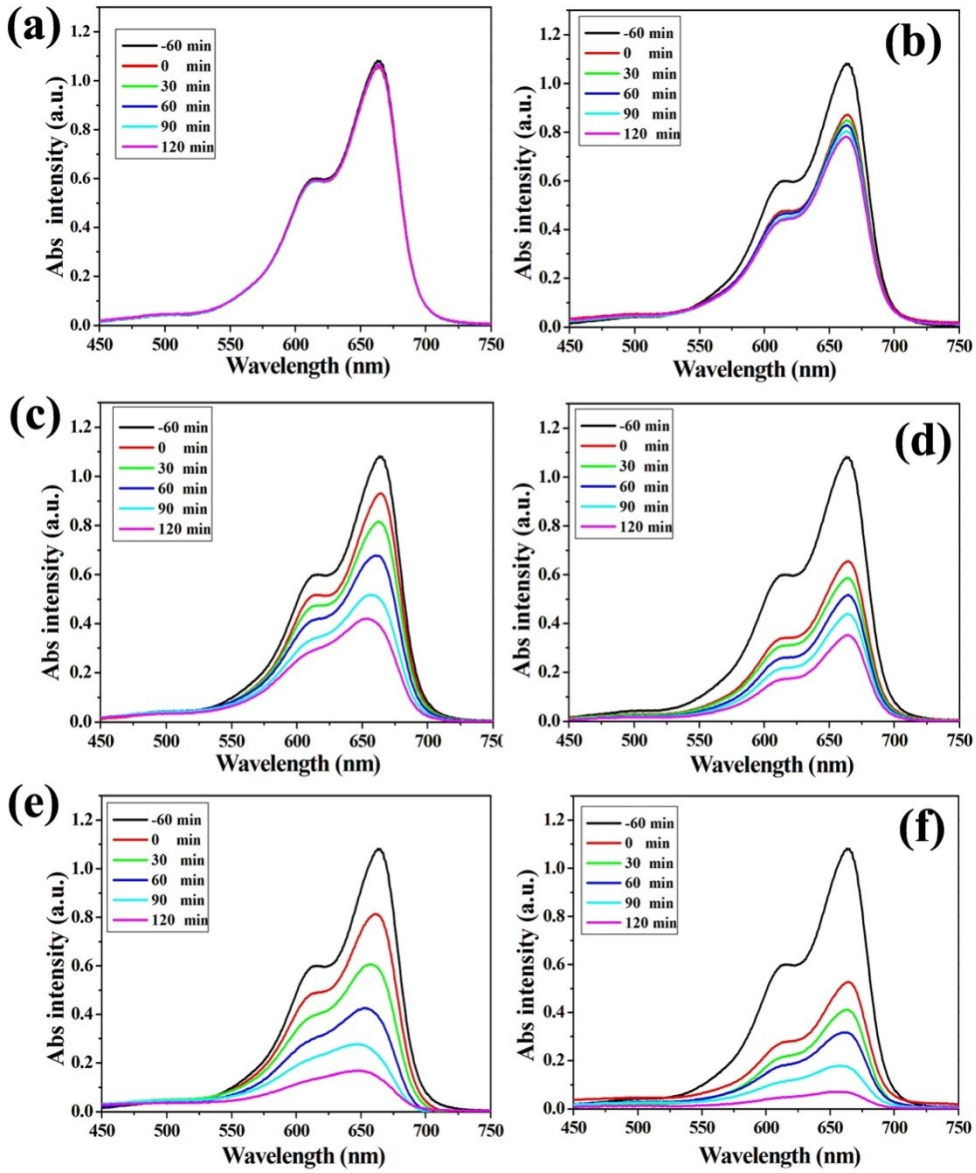

Figure S9. absorption spectra of the solution of MB in the presence of different photocatalysts (30 mg·mL^{-1}): a) no catalysts; b) TiO_2; c) TiO_2-anatase; d) pure MoS_2; e) MoS_2/TiO_2 core−shell microspheres; f) MoS_2/TiO_2 yolk–shell microspheres.

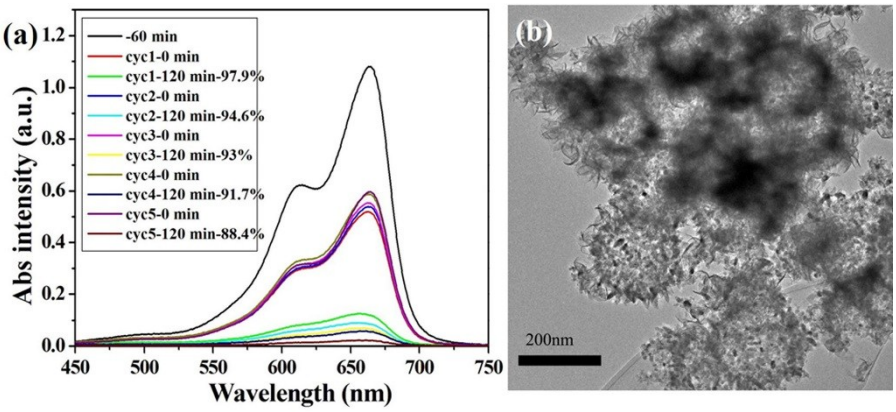

Figure S10 (a) absorption spectra of degradation of MB using MoS_2/TiO_2 hollow microspheres as the photocatalyst after visible light irradiation for five cycles; (b) TEM image of MoS_2/TiO_2 hollow microspheres after photocatalytic degradation.

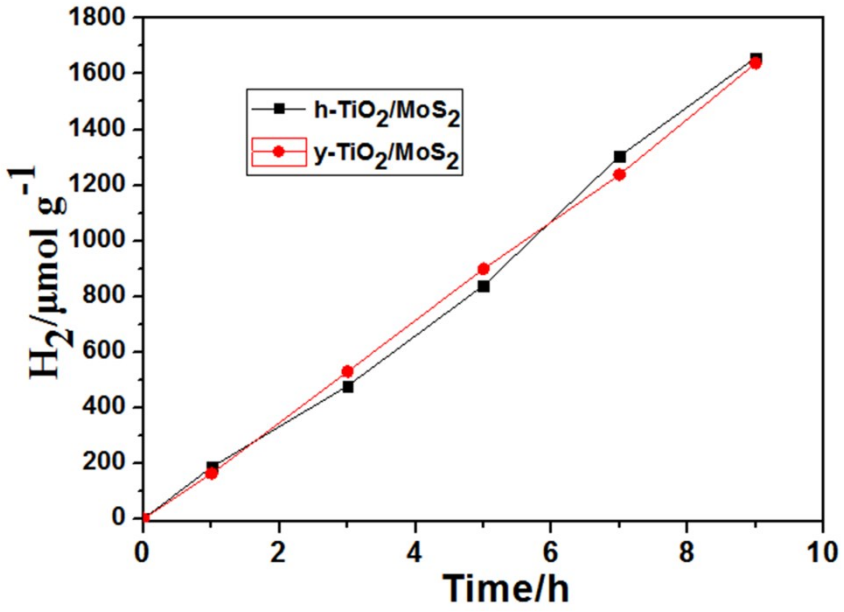

Figure S11. The photocatalytic hydrogen evolution for y−TiO_2/MoS_2 and h−TiO_2/MoS_2