Electronic Supplementary Information

Design and mechanism of core-shell TiO_2 nanoparticles as a high-performance photothermal agent

Lei Sun,[a,c] Zhenglin Li,[a] Zhuo Li,[a] Ying Hu,[d] Chong Chen,[a] Chenhui Yang,[a] Baosheng Du,[b] Ye Sun,*[b] Flemming Besenbacher,*[c] and Miao Yu*[a]

[a]*State Key Laboratory of Urban Water Resource and Environment, School of Chemical Engineering and Technology, Harbin Institute of Technology, Harbin 150001, China. E-mail: miaoyu_che@hit.edu.cn*

[b]*Condensed Matter Science and Technology Institute, Harbin Institute of Technology, Harbin 150001, China. E-mail: sunye@hit.edu.cn*

[c]*Interdisciplinary Nanoscience Center (iNANO) and Department of Physics and Astronomy, Aarhus University, Aarhus 8000, Denmark*. *E-mail*: fbe@inano.au.dk

[d]*School of Life Science and Technology, Harbin Institute of Technology, Harbin 150001, China*

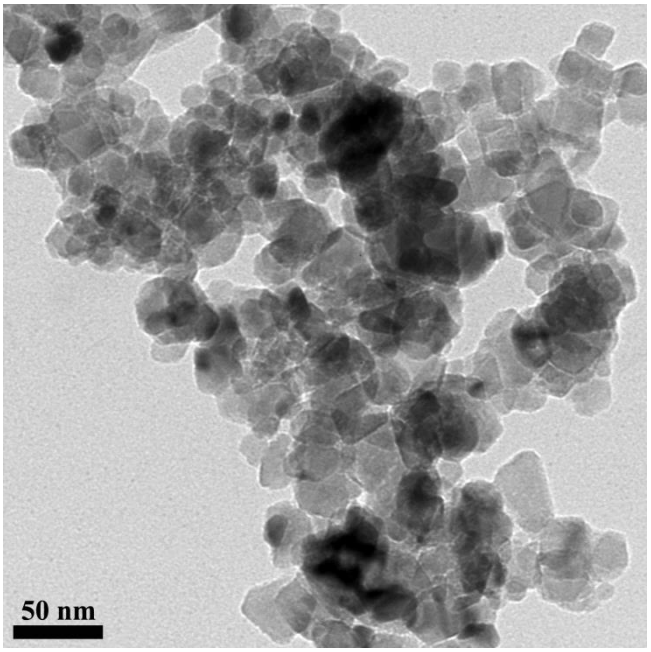

Figure S1. TEM image of the pristine TiO_2.

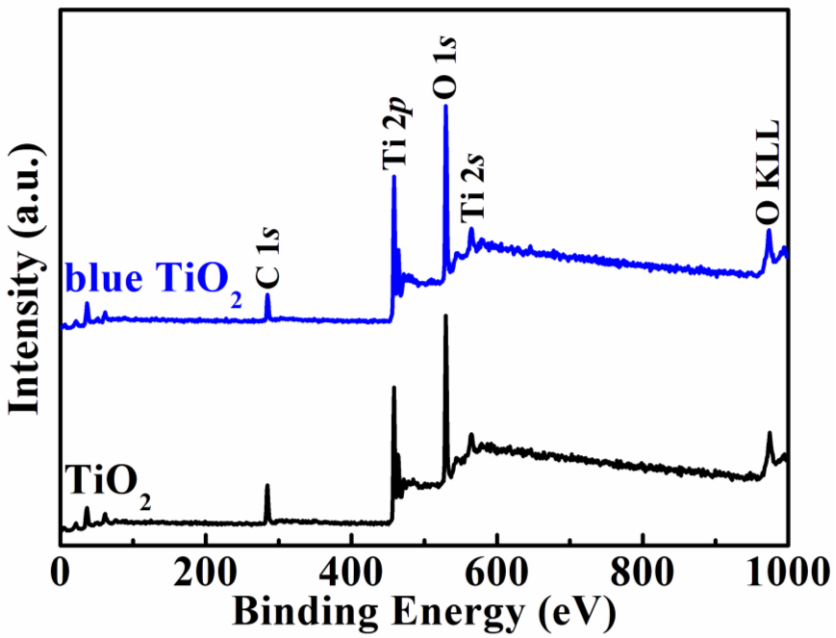

Figure S2. XPS survey of the pristine and blue TiO_2 samples.

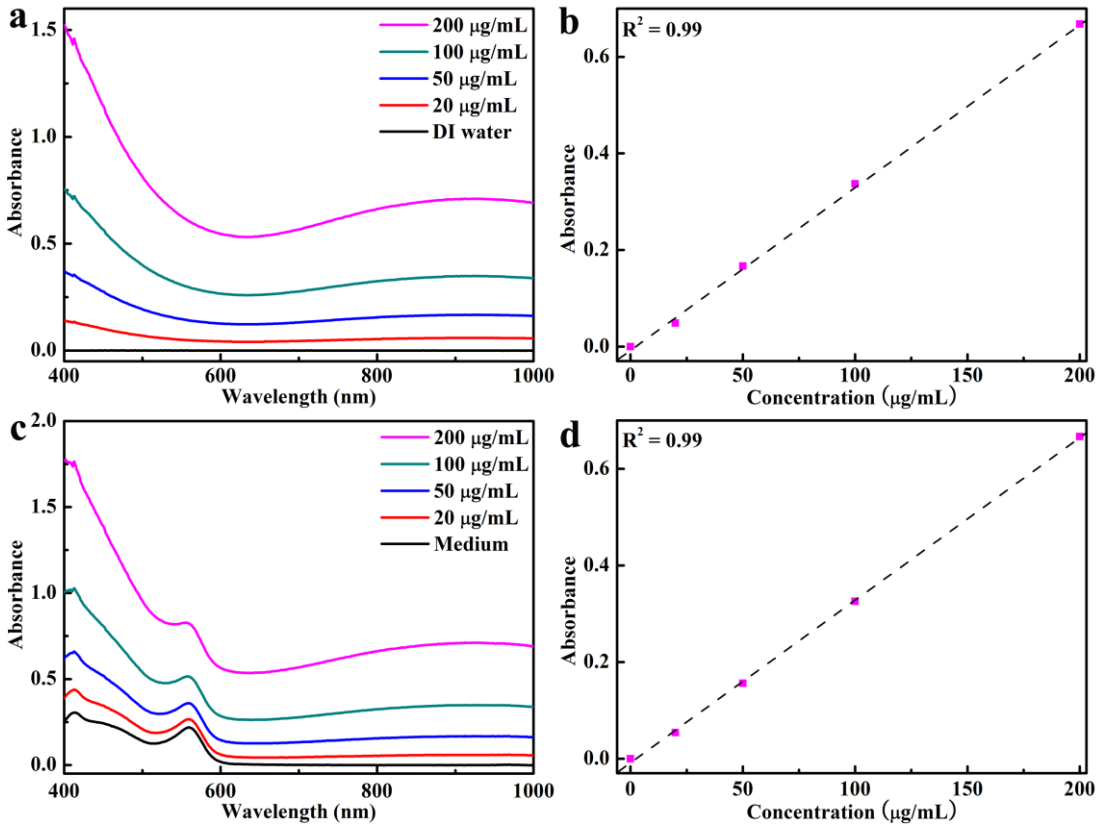

Figure S3. (a) UV−Vis−NIR absorption spectra and (b) fitting curve of the absorption values at 808 nm of the blue TiO_2 dispersions at different concentrations in water. (c) UV−Vis−NIR absorption spectra and (d) fitting curve of the absorption values at 808 nm of the blue TiO_2 dispersions at different concentrations in 1640 culture medium containing 10% FBS.

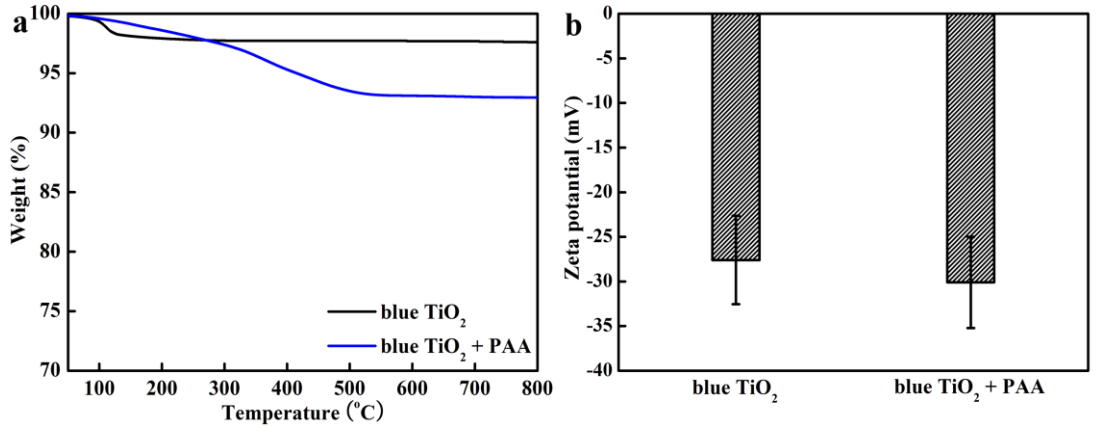

Figure S4. (a) TGA curves and (b) Zeta potential of the blue TiO_2 before and after PAA coating.

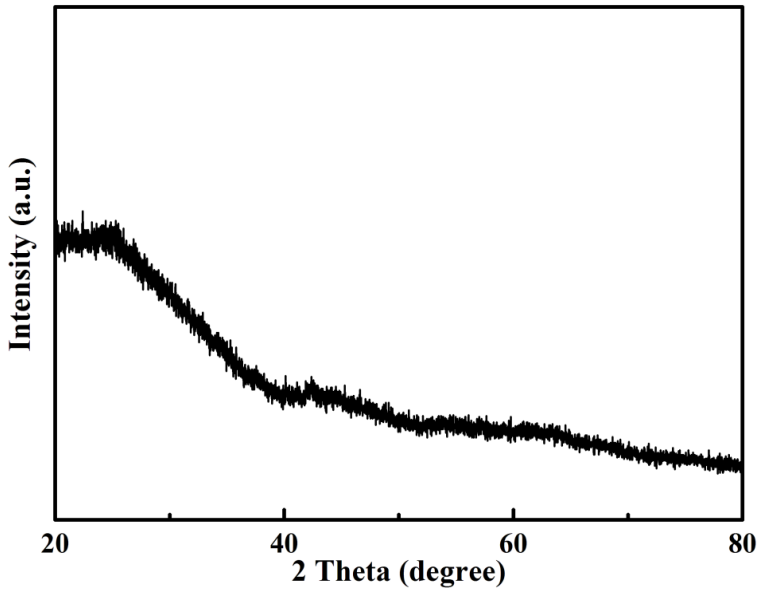

Figure S5. XRD of the black TiO_2.

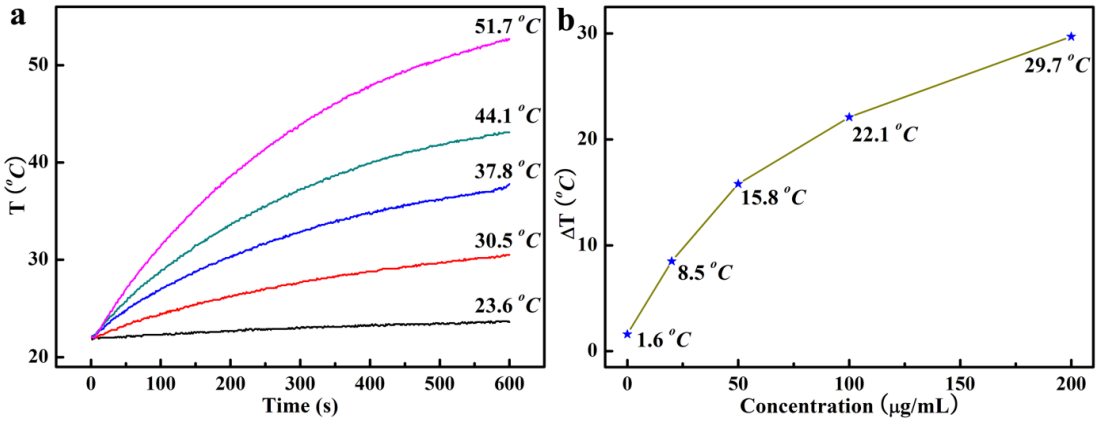

Figure S6. (a) Temperature elevation of the black TiO_2 suspension at various concentrations upon NIR irradiation; (b) Plot of temperature variation upon a 600 s irradiation *versus* the concentration of the black TiO_2.

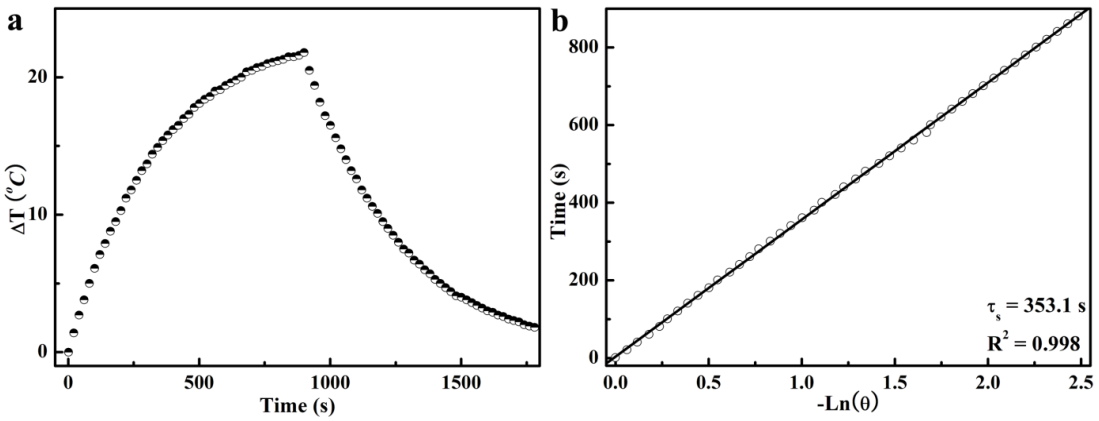

Figure S7. (a) Heating and cooling curves of the black TiO_2 suspension (80 μg/mL); (b) Plot of cooling time versus negative natural logarithm of the temperature driving force.

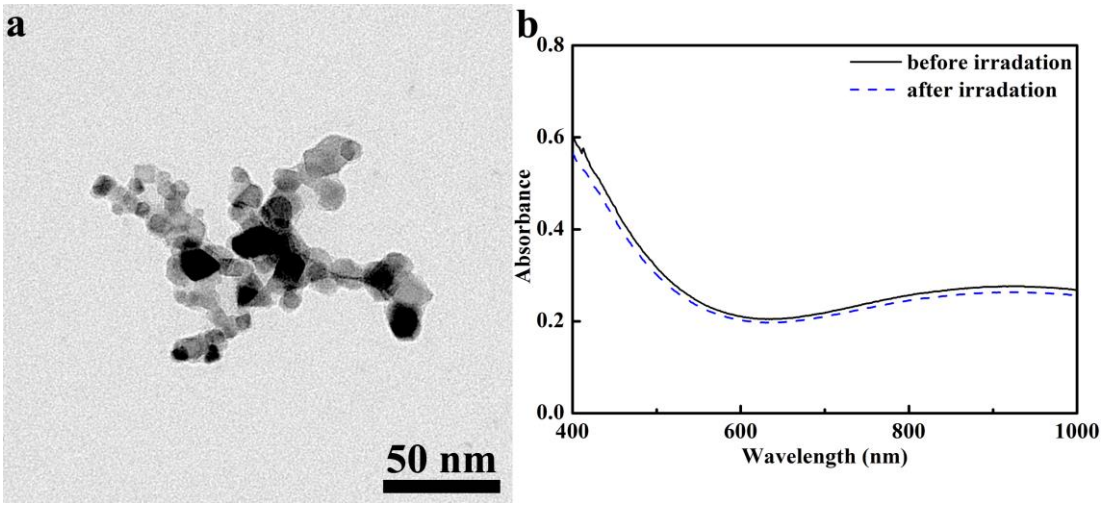

Figure S8. (a) TEM image and (b) UV−Vis−NIR of the blue TiO_2 after five repeated irradiation.

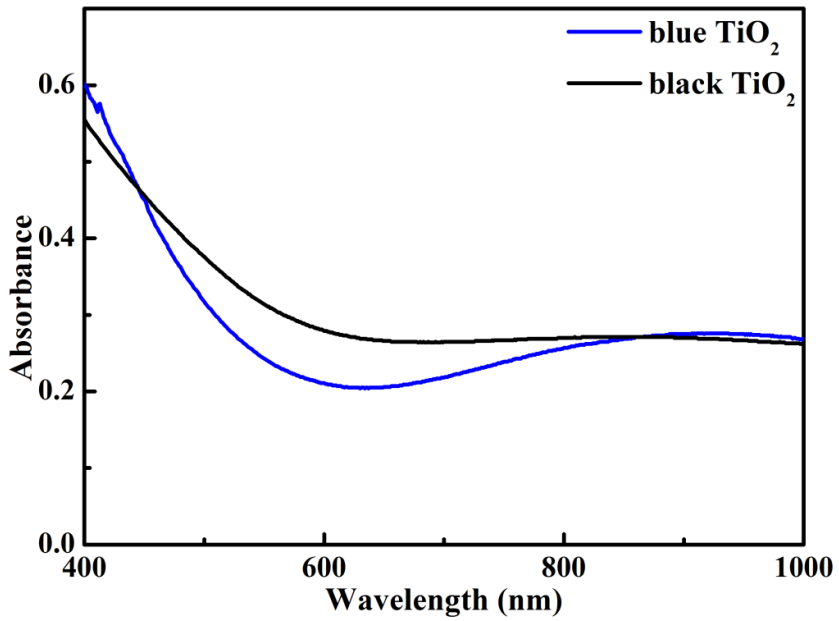

Figure S9. UV−vis-NIR absorption spectra of the blue and black TiO_2 dispersion (80 μg/mL).

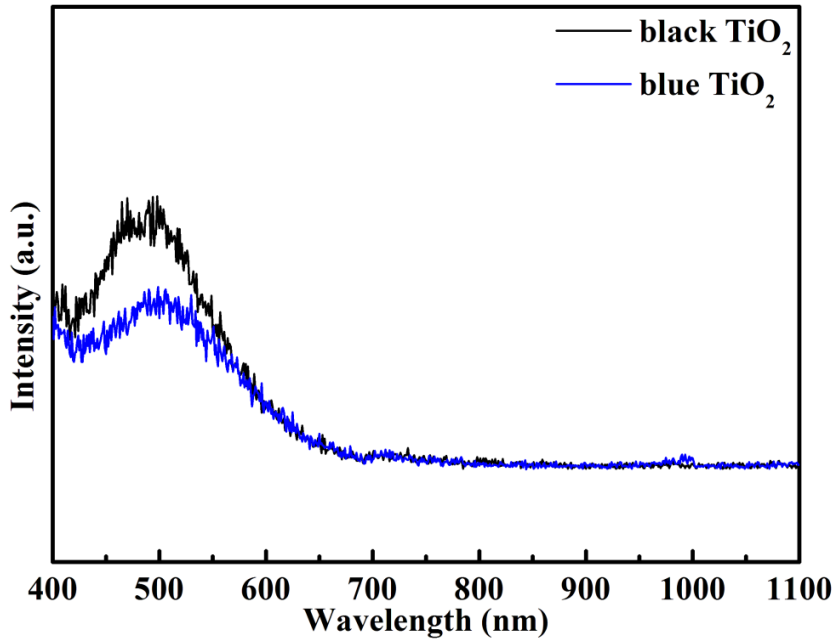

Figure S10. Photoluminescence emission spectra of the blue and black TiO_2.

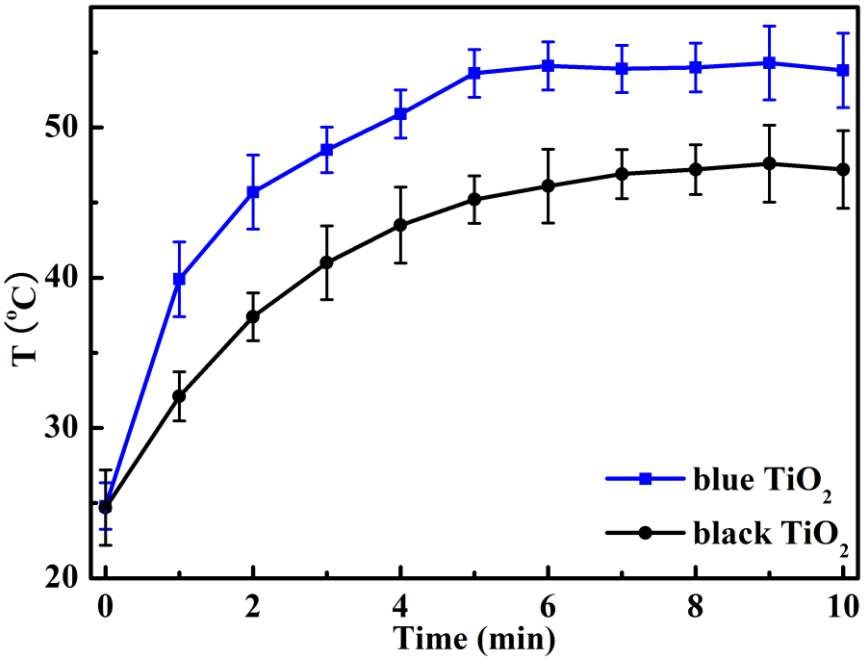

Figure S11. Temperature elevation of the blue and black TiO_2 placed on an 80 °C heating plate and measured at different time points (0-10 min).