

Electronic Supplementary Information

Controlled Synthesis of Magnetic Iron Oxides@SnO₂ Quasi-Hollow Core-Shell Heterostructures: Formation Mechanism, and Enhanced Photocatalytic Activity

*Wei Wu, Shaofeng Zhang, Feng Ren, Xiangheng Xiao, Juan Zhou and Changzhong Jiang**

¹School of Printing and Packaging, Wuhan University, Wuhan 430072, P. R. China

²Key Laboratory of Artificial Micro- and Nano-structures of Ministry of Education, Wuhan University,
Wuhan 430072, P. R. China

³Center for Electronic Microscopy and School of Physics and Technology, Wuhan University, Wuhan
430072, P. R. China

*To whom correspondence should be addressed. Tel: +86-27-68752567. Fax: +86-27-68753587. E-mail:

czjiang@whu.edu.cn.

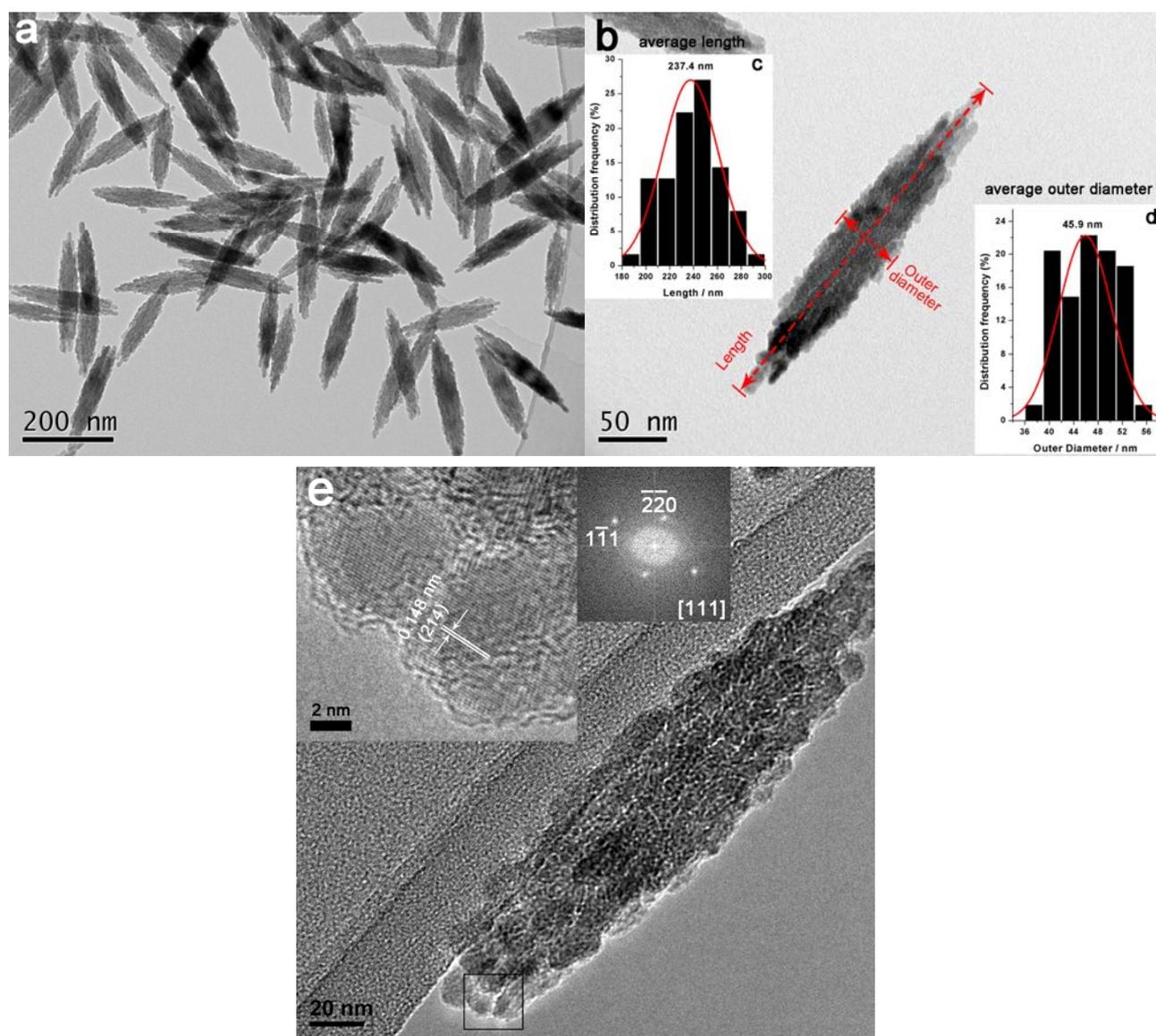


Figure 1

Figure S1 TEM images of spindle-like α -Fe₂O₃ seeds at different magnification (a, b). The insert are the corresponding size histograms for the length (c) and outer diameter (d) of the α -Fe₂O₃ seeds, HRTEM images of the single α -Fe₂O₃ particle (e)

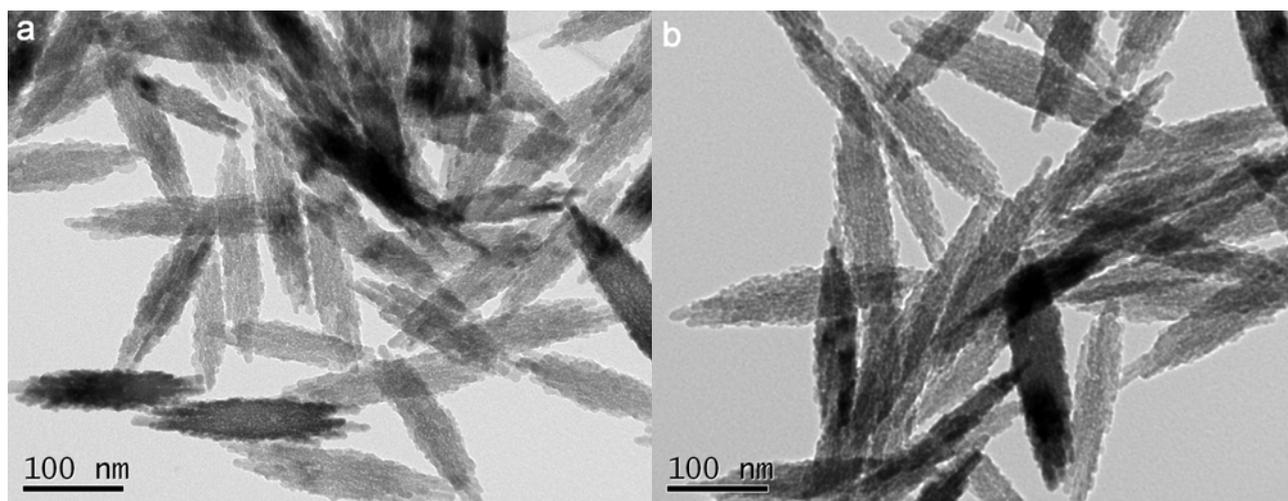


Figure S2 The representative TEM images of α -Fe₂O₃ seeds after the same reaction process without the presence of tin precursor at different reaction times: a) 24 h; b) 36 h.

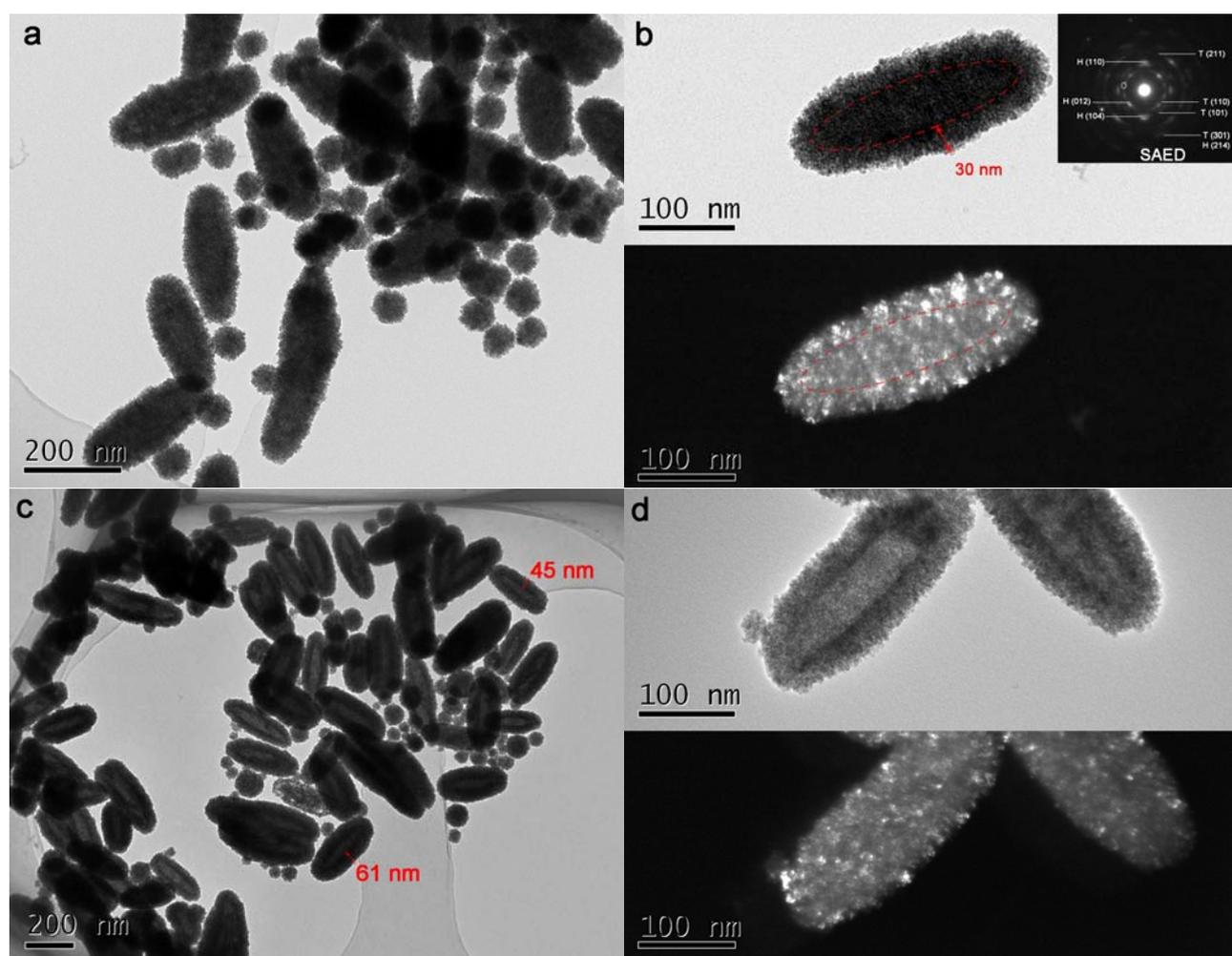
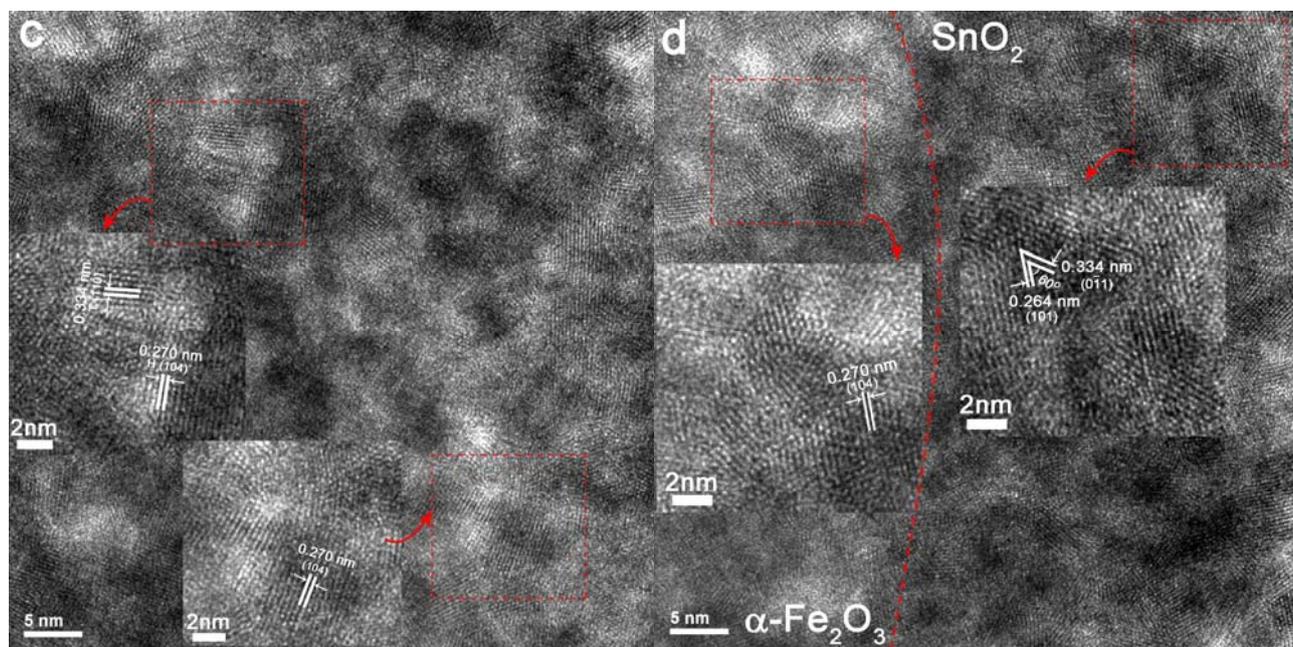
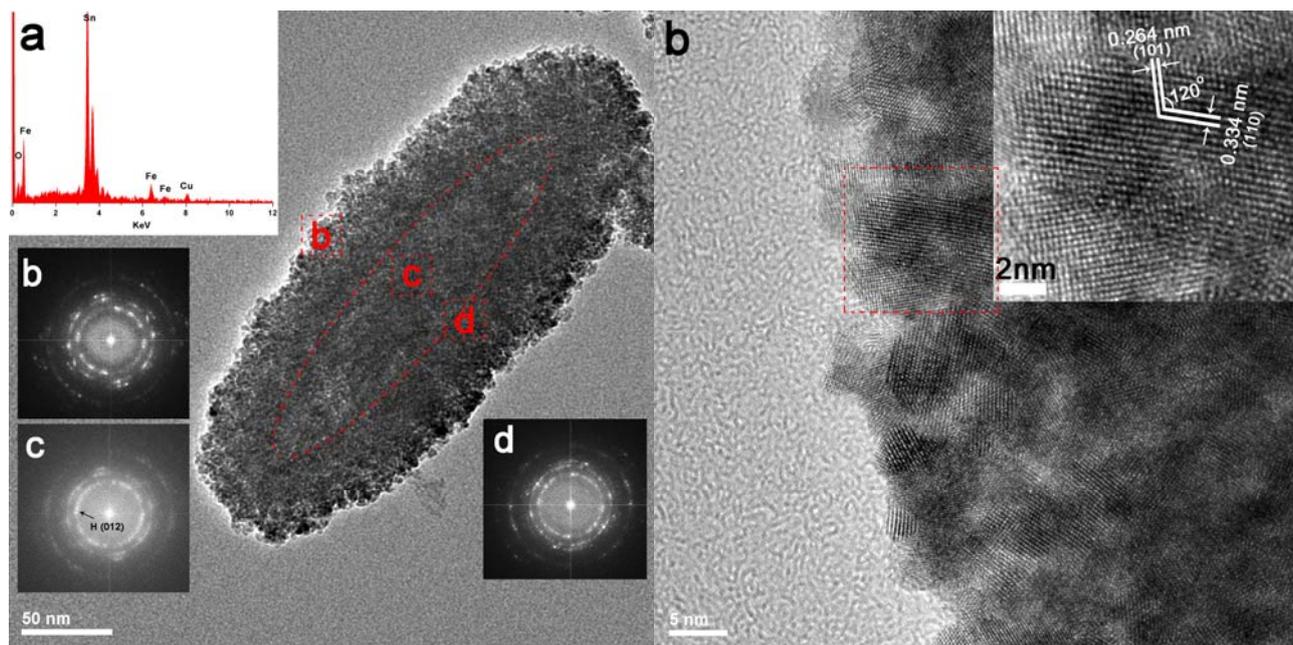


Figure S3 Bright-field and dark-field TEM images of the product obtained at different reaction time: (a, b) 12 h and (c, d) 36 h.



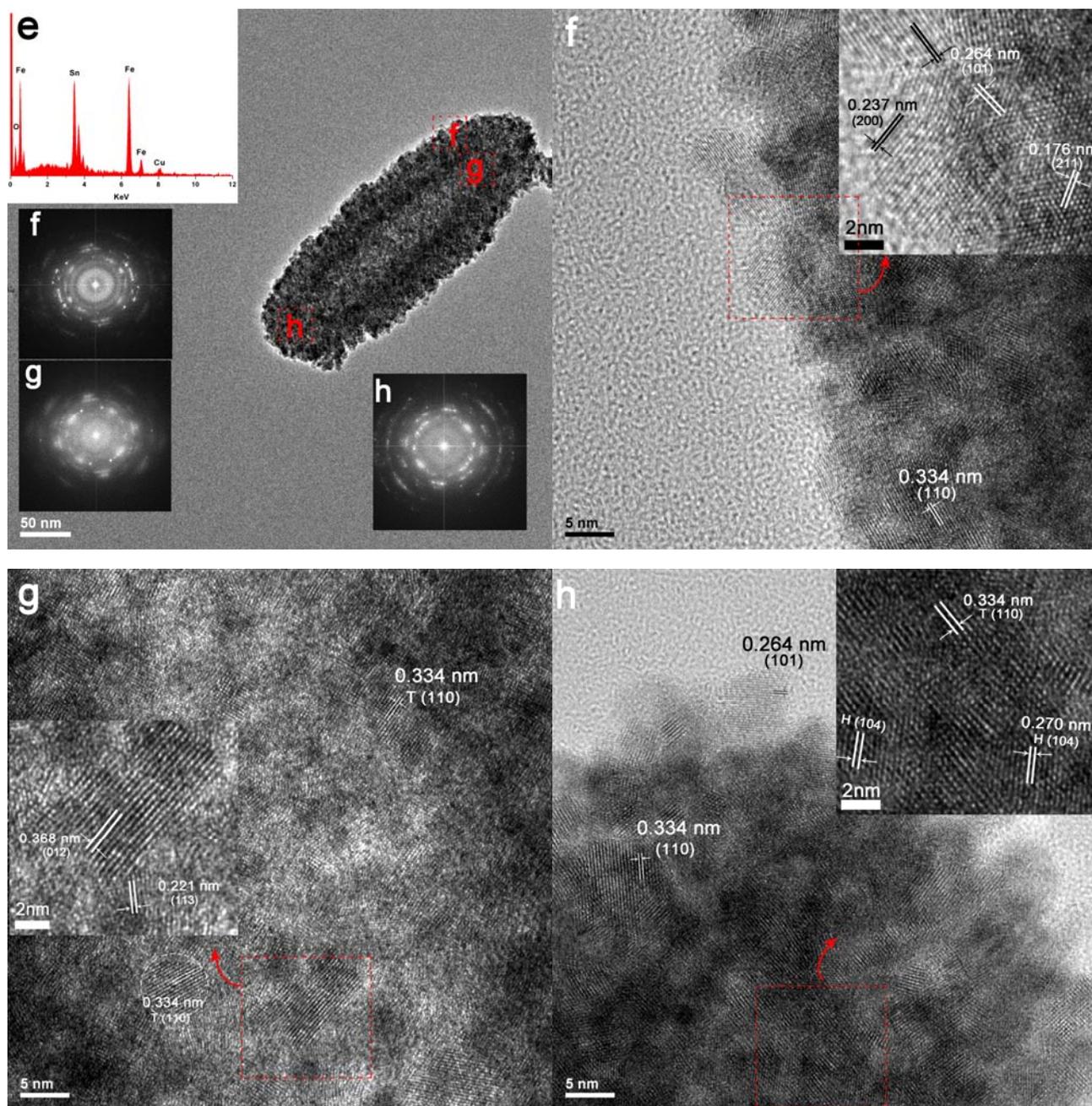


Figure S4 High-magnification TEM image of the as-obtained single α -Fe₂O₃/SnO₂ composite particle at 24 h (a), (b)-(d) are the corresponding HRTEM images of the edge, center and interface region, respectively; (e) is the High-magnification TEM image of the as-obtained single α -Fe₂O₃/SnO₂ composite particle at 36 h, (f)-(h) are the corresponding HRTEM images of the edge, center and tip region, respectively. The insert in (a) and (e) are the EDX spectra and corresponding FFT patterns of HRTEM images from the labeled square regions, and the insert in the other images are the enlarge image corresponding the labeled regions.

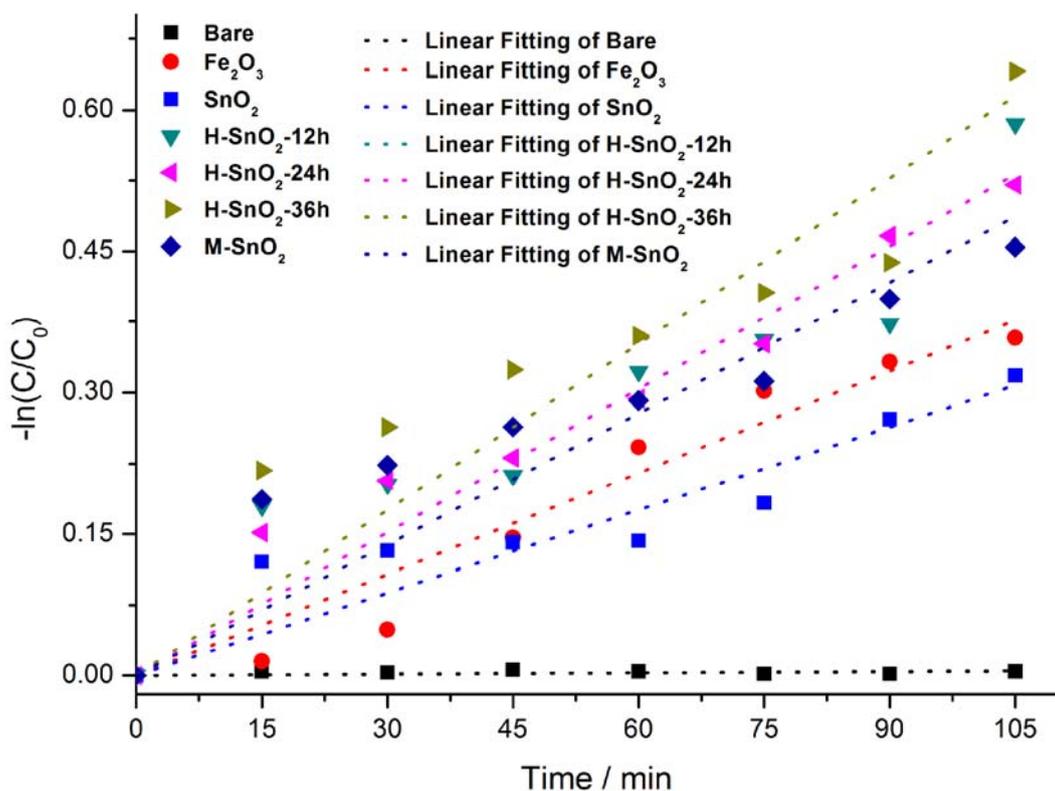


Figure S5 Effect of samples on the kinetics of RhB: a) no any photocatalyst present; b) α -Fe₂O₃ seeds; c) commercial SnO₂ product (the size is about 70 nm); d) as-prepared α -Fe₂O₃/SnO₂ core-shell nanoparticles at 12 h; e) 24 h; f) 36 h and g) as-prepared Fe₃O₄/SnO₂ core-shell nanoparticles (the mass of all the sample is about 20 mg).