Supporting Information

Three-dimensional lupinus-like TiO_2 nanorod@Sn_3O_4 nanosheet hierarchical heterostructured arrays as photoanode for enhanced photoelectrochemical performance

Luping Zhu[†,‡,*], Hao Lu[‡,§], Dong Hao[‡], Lingling Wang[†], Zihua Wu[†], Lijun Wang[†,*], Peng Li[‡], Jinhua Ye[‡,±]

[†]*School of Environmental and Materials Engineering, Shanghai Polytechnic University, Shanghai, 201209, P. R. China,* lpzhu@sspu.edu.cn(L. Zhu); ljwang@sspu.edu.cn(L. Wang)

[‡]*International Center for Materials Nanoarchitectonics (WPI-MANA), National Institute for Materials Science (NIMS), Tsukuba , Ibaraki 305-0044 , Japan,* ZHU.Luping@nims.go.jp

[§]*College of Physics, Optoelectronics and Energy & Collaborative Innovation Center of Suzhou Nano Science and Technology, Soochow University, Suzhou 215006, P. R. China*

[±]*TU-NIMS Joint Research Center, School of Materials Science and Engineering, Tianjin University, Tianjin, 300072, P.R. China*

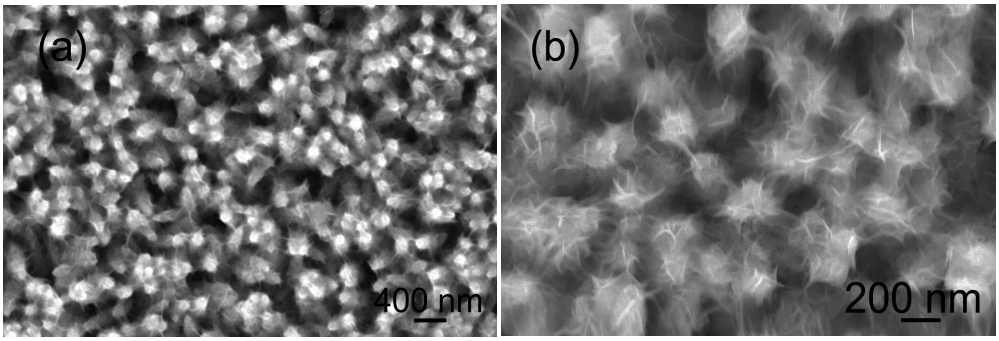

Figure S1. SEM images of the as-synthesized hybrid nanostructures without urea. a) Low-magnification. b) High-magnification.

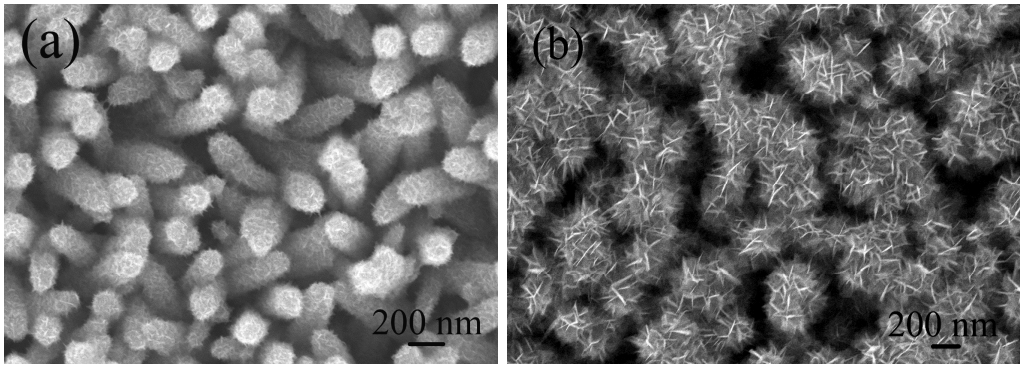

Figure S2. SEM images of the as-synthesized TiO_2@Sn_3O_4 hybrid nanostructures at 120°C for (a) 4 h and (b) 8 h.

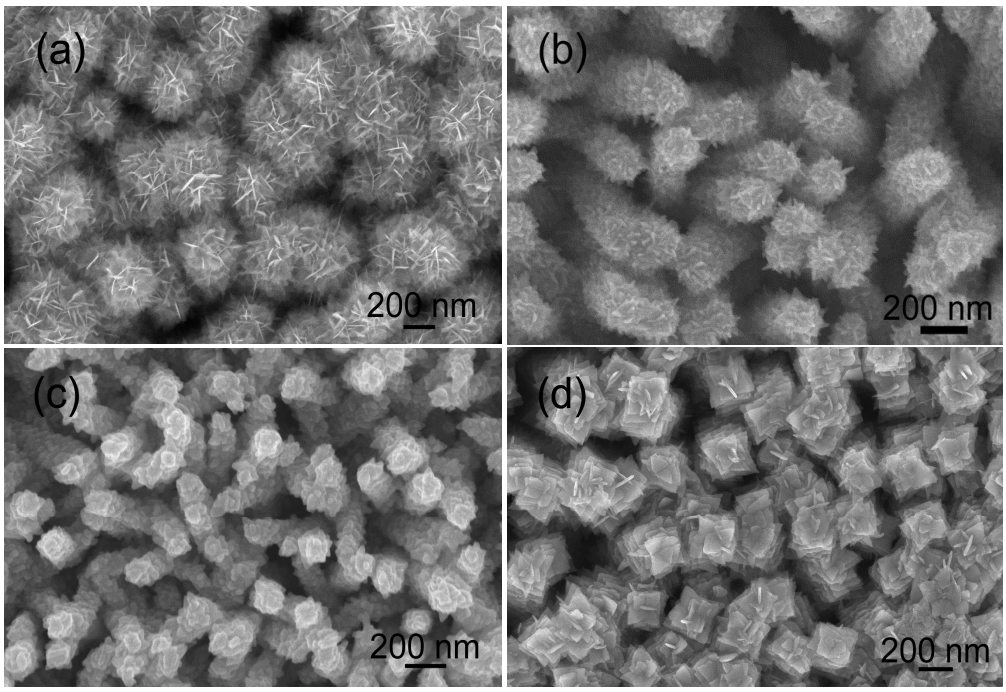

Figure S3. SEM images of the as-synthesized hybrid nanostructures. a) at 120°C for 12h. b) at 150°C for 4h. c, d) at 180°C for 6h with 0.5 mmol and 2 mmol of $SnCl_2$.

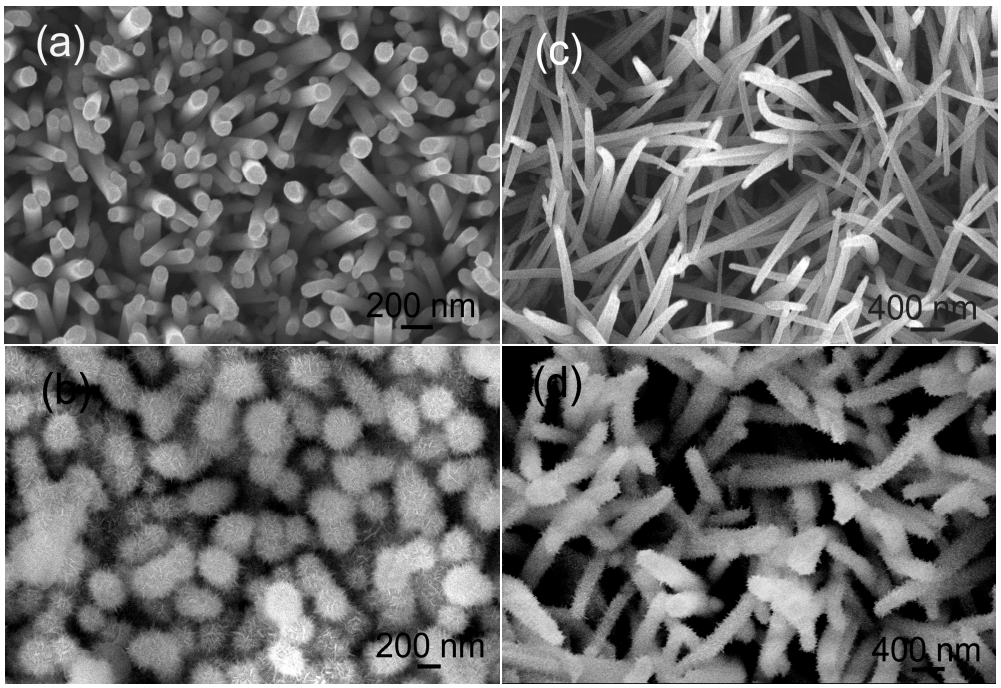

Figure S4. SEM images of a) ZnO NRAs and b) 3D ZnO@Sn_3O_4 HHAs on FTO, c) Co_3O_4 NWAs and d) 3D Co_3O_4@Sn_3O_4 HHAs on FTO.

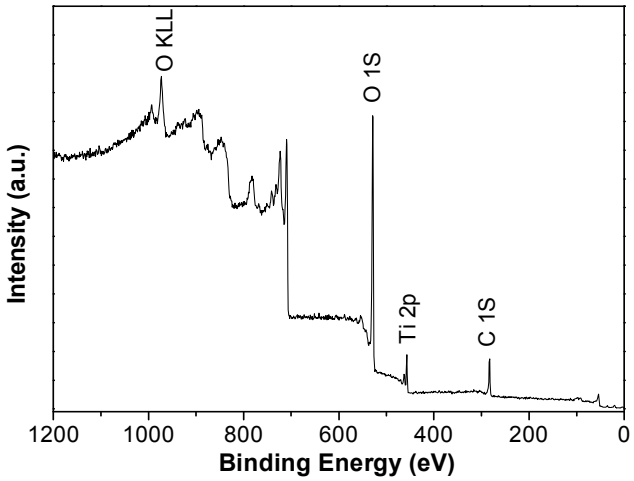

Figure S5. XPS survey spectrum of the TiO_2 NRAs.

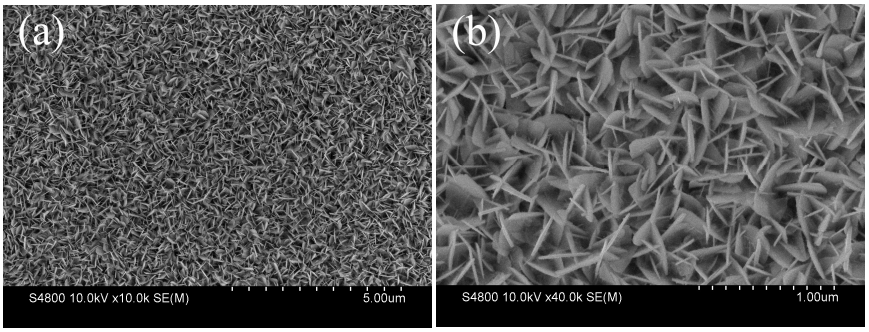

Figure S6. SEM images of the as-synthesized Sn_3O_4 NSs. (a) Low-magnification. (b) High-magnification.