Electronic Supplementary Information

$SrNb_2O_6$ nanotubes with enhanced photocatalytic activities

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I. Effects of solution pH on morphology and phase (Temperature: 200 ^{o}C, time: 12 h).

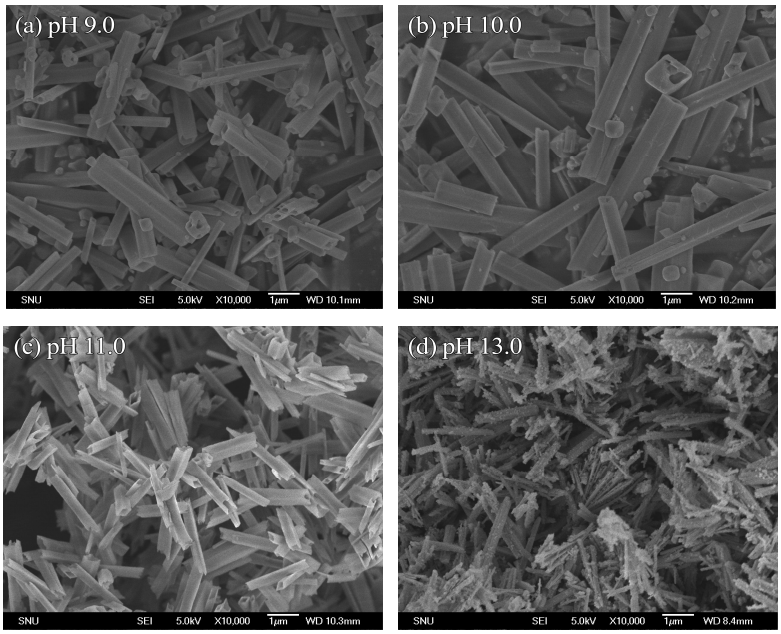

Fig. S1. FESEM images of $SrNb_2O_6$ powders prepared at different pH values.

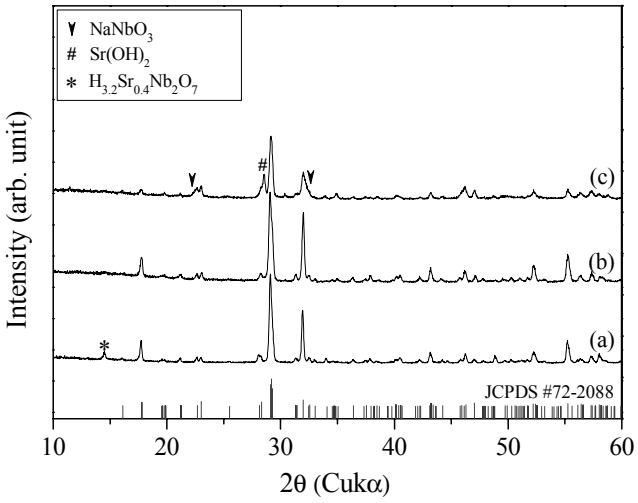

Fig. S2. XRD patterns of $SrNb_2O_6$ powders prepared at different pH values: (a) pH 10.0; (b) pH 11.0; (c) pH 13.0.

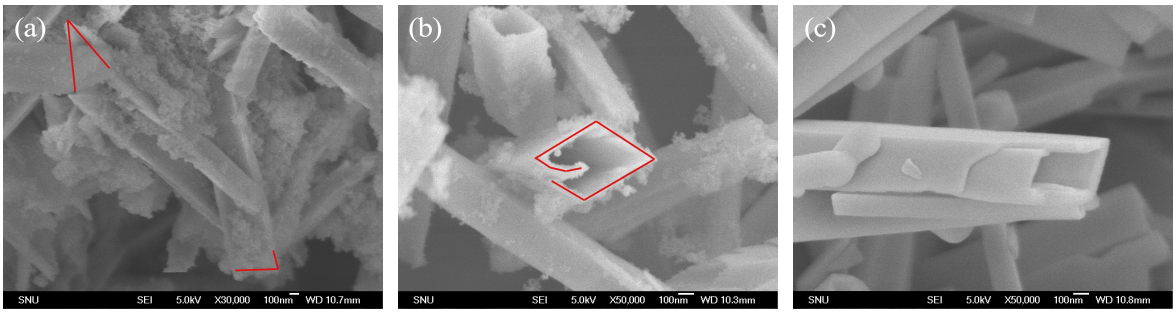

Fig. S3. FESEM images of intermediate morphologies during hydrothermal process, (a), (b) 200°C/6h and (c) 200°C/12h.

II. $SrNb_2O_6$ bulk powder prepared by a conventional solid-state reaction method

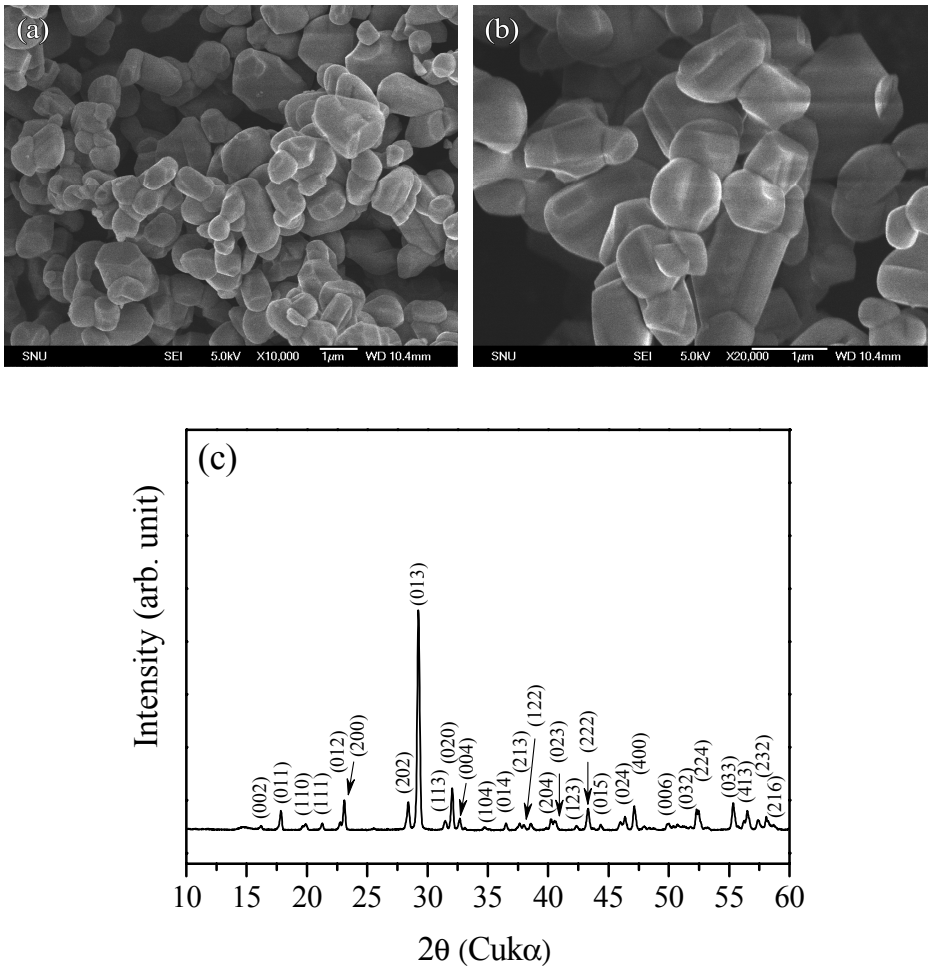

Fig. S4. FESEM images (a, b) and XRD pattern (c) of bulk $SrNb_2O_6$ powder prepared at

1150^{o}C for 2h.

III. Photocatalytic H_2 and O_2 evolution from pure water splitting.

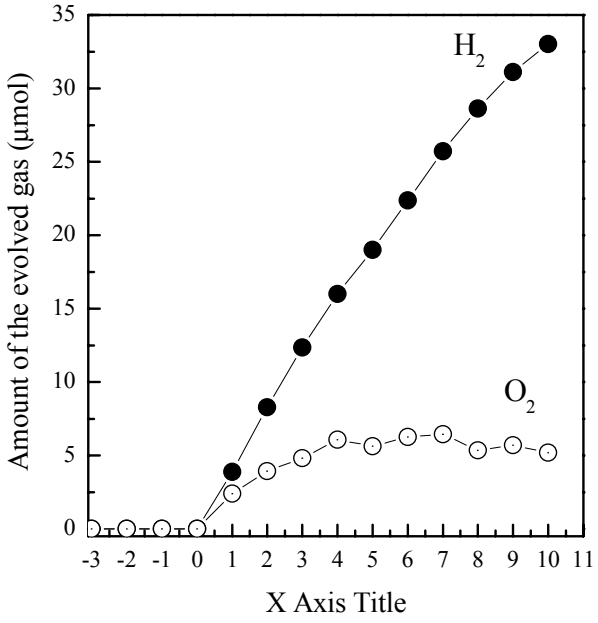

Fig. S5. Photocatalytic H_2 and O_2 evolution from pure water splitting using $SrNb_2O_6$ nanotube powder under UV light irradiation (Stoichiometric O_2 evolution was not observed during the pure water splitting under UV light irradiation, which should result in H_2 evolution in a stoichiometric ratio (H_2 : O_2 = 2 : 1). The photocatalytic evolution of a trace amount of O_2 was detected in the initial photocatalytic reaction, but it gradually disappeared. A similar phenomenon was also observed with other photocatalysts such as $AgIn(WO_4)_2$, $InMO_4$ (M = Nb, Ta, V) and TiO_2, etc.[s1-s3] It was proposed that the photo-generated holes in the valence band are consumed through the neutralization reaction with surface chemisorbed O^{2-} species, which leads to the formation of the physisorbed O_2. At the same time, the O^{2-} species was formed again by the trapped electrons. However, the detailed mechanisms underlying the absence of O_2 evolution from pure water need to be further clarified).

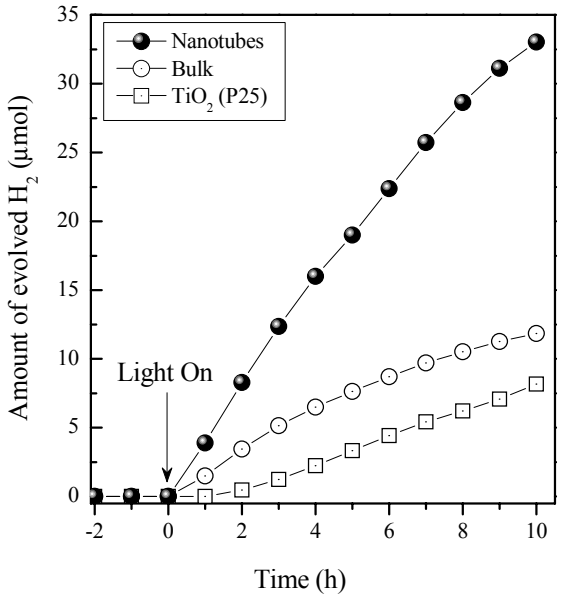

Fig. S6. Comparison of hydrogen production rate between $SrNb_2O_6$ and TiO_2(P25) powders.

References

1. Song, S.; Zhang, Y.; Xing, Y.; Wang, C.; Feng, J.; Shi, W.; Zheng, G.; Zhang, H. *Adv. Funct. Mater*. **2008**, 18, 2328.

2. Tang, J.; Zou, Z.; Ye, J. *J. Phys. Chem.* B. **2003**, 107, 14265.

3. Linsebigler, A. L.; Lu, G.; Yates, J. T., Jr. *Chem. Rev*. **1995**, 95, 735.