Supporting information

Effects of Rh-doping on the Photooxidative Degradation Activity of

Titanate Nanosheets

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Fig. S1. The schematic of $\text{H}_2\text{Ti}_3\text{O}_7$ crystal shows the monoclinic crystal system which the space group is P2/m.
Fig. S2. XRD patterns of synthesized $\text{Na}_2\text{Ti}_{3-x}\text{Rh}_x\text{O}_7$, ● is the peak of the unknown.
Fig. S3. A) XRD patterns of synthesized $\text{H}_2\text{Ti}_{3-x}\text{Rh}_x\text{O}_7$. And, B) The XRD patterns of the non-exfoliated TiNS:Rh10 compared with $\text{H}_2\text{Ti}_{3-x}\text{Rh}_x\text{O}_7$ (TiNS:Rh10). ● is the peak of the unknown.
Fig. S4. shows the AFM image and its cross sectional profiles of TiNS:Rh0 on Si substrate. The sample was prepared by dipping a Si substrate in the TiNS:Rh0 colloidal solution (pH 11) overnight, then washed and dried under vacuum condition. A-B showed the cross section of TiNS 1 sheet. The thickness value of 1 sheet (~1.5-1.6 nm) is 2 times larger than its theoretical value (~0.7 nm), because of TMA+ ion on TiNS surface. C-D showed cross section of overlapped 2 sheets. The thickness value of overlapped 2 sheets is about 2 times larger than 1 sheet.
**Fig. S5.** shows XPS spectra of Ti 2p and Rh 3d for TiNS:Rh0 and TiNS:Rh10. The peak intensity of Ti 2p$_{1/2}$ and 2p$_{3/2}$ decreased after it was doped, this shows that the Rh replaced in the Ti site.
Fig. S6. XPS spectra of Rh 3d5/2, with fit for Rh$^{3+}$ (308.9 eV) and its oxidized state, Rh$^{4+}$ (309.9 eV) according to the several authors reported.$^{1-2}$ It also has been found that the binding energy of Rh$^{3+}$ is a little bit higher than Rh$_2$O$_3$.$^{3}$ This showed that Rh$^{3+}$ and Rh$^{4+}$ were doped in the lattice of TINS.

References

