Electronic Supplementary Information

Effective Strategy for Enhancing Z-scheme Water Splitting with IO₃⁻/I⁻ Redox Mediator by using Visible Light Responsive TaON Photocatalyst Co-loaded with Independently Optimized Two Different Cocatalysts

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Figure S1. Time courses of photocatalytic oxidation of water on TaON photocatalyst loaded with metal cation species in aqueous solution containing NaIO₃ (1 mM) under visible light irradiation (photocatalyst; 50 mg, amount of Milli-Q water; 180 mL, irradiation wavelength; λ > 400 nm).
Figure S2. XPS spectrum of Rh3d$_{5/2}$ region for TaON loaded with Rh species prepared by the impregnation followed by calcination at 500 ºC in air (1 wt% as Rh metal). The binding energy of the deposited Au was adjusted to 84.0 eV.

Figure S3. XPS spectra of Rh3d region for TaON loaded with Rh species prepared at 500 ºC and sample after stirring in aqueous solution under dark for 3 h, along with those of RhO$_2$•2H$_2$O, Rh$_2$O$_3$, and Na$_3$[RhCl$_6$]•nH$_2$O for comparison. The binding energy of the deposited Au was adjusted to 84.0 eV.
Figure S4. XPS spectra of Rh3d region for Rh500-Ru200 samples before and after reaction. The binding energy of the deposited Au was adjusted to 84.0 eV.

Figure S5. XPS spectra of Rh3d region for TaON samples loaded with Rh species using (a) Na₃[RhCl₆]•nH₂O, (b) Rh(NO₃)₃•nH₂O as precursor and those of reference samples. The binding energy of the deposited Au was adjusted to 84.0 eV. The loading of Rh species from Rh(NO₃)₃•nH₂O was carried out in same manner as to that from Na₃[RhCl₆]•nH₂O described in the main text.
Figure S6. The rate of O$_2$ evolution on TaON photocatalyst co-loaded with Rh species with Rh(NO$_3$)$_3$$\cdot$$n$H$_2$O at different temperature (100–500 ºC) and Ru species at 200 ºC from aqueous solution containing NaIO$_3$ (1 mM) under visible light irradiation (photocatalyst; 50 mg, amount of Milli-Q water; 180 mL, irradiation wavelength; $\lambda > 400$ nm).

Figure S7. Current-potential curves of TaON electrodes loaded with Rh species, along with those of TaON electrode loaded with Ru species and unmodified TaON electrode in Na$_2$SO$_4$ (0.1 M) solution containing NaIO$_3$ (1 mM) under dark.
Figure S8. Influence of the loading amount of Rh species on the rate of O\textsubscript{2} evolution on TaON co-loaded with x wt% Rh at 500 °C and 0.1wt% Ru at 200 °C photocatalysts (50 mg) suspended in an aqueous solution containing NaIO\textsubscript{3} (1 mM) with NaI (0.2 mM) under visible light irradiation (amount of water; 180 mL, irradiation wavelength; \(\lambda > 400\) nm).

Figure S9. Influence of the loading amount of Ru species on the rate of O\textsubscript{2} evolution on TaON co-loaded with 0.05 wt% Rh at 500 °C and x wt% Ru at 200 °C (50 mg) suspended in an aqueous solution containing NaIO\textsubscript{3} (1 mM) with NaI (0.2 mM) under visible light irradiation (amount of water; 180 mL, irradiation wavelength; \(\lambda > 400\) nm).