Electronic Supplementary Information (ESI)

Hydrothermal synthesis of rhodium-doped barium titanate nanocrystals for enhanced photocatalytic hydrogen evolution under visible light

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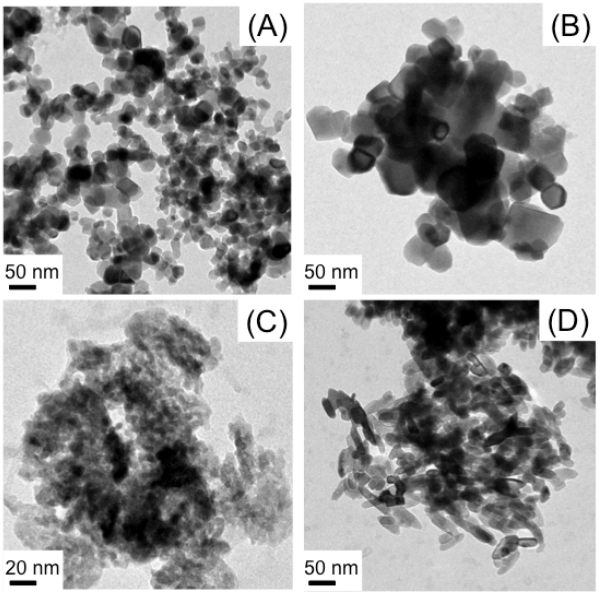

Fig. S1. TEM images of TiO_2 used as the starting material in this work.

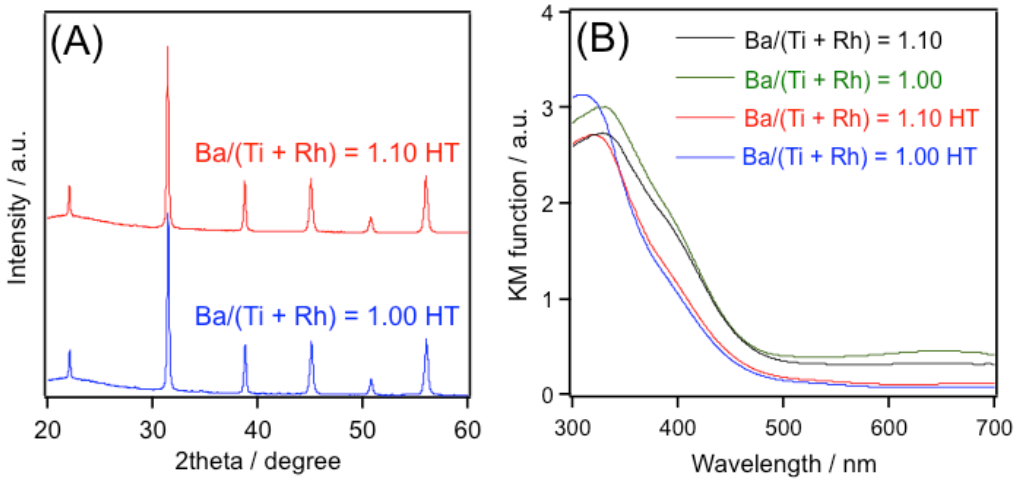

Fig. S2. (A) XRD patterns and (B) UV-visible diffuse reflectance spectra of $BaTiO_3$:Rh prepared with and without addition of an excess amount of $Ba(OH)_2 \cdot 8H_2O$ (10 mol%) in the HT process (without post-heating). Data for the samples after post-heating at 1173 K with an excess amount of $Ba(OH)_2 \cdot 8H_2O$ (5 mol%) are also shown. Here P25 TiO_2 was used in all cases.

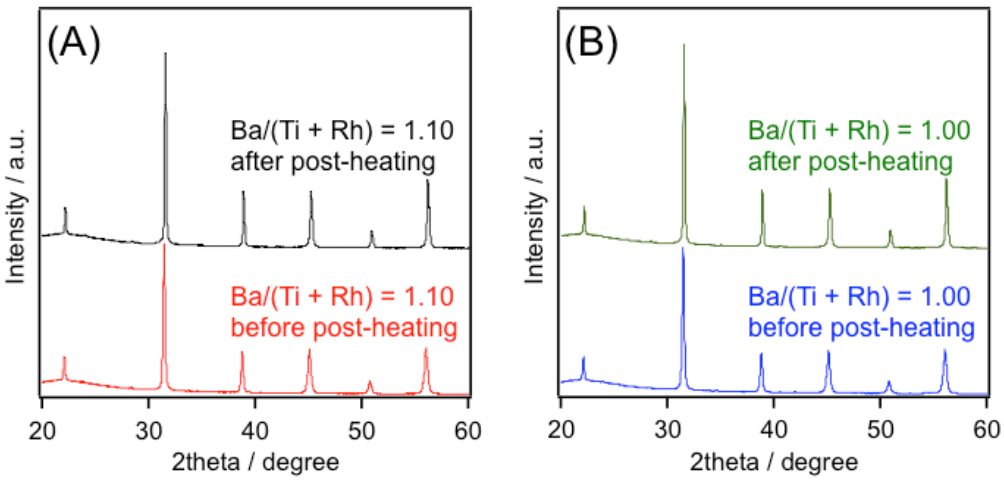

Fig. S3. XRD patterns of $BaTiO_3$:Rh prepared (A)with and (B)without addition of an excess amount of $Ba(OH)_2 \cdot 8H_2O$ (10 mol%) in the HT process (without post-heating) and after post-heating at 1173 K with an excess amount of $Ba(OH)_2 \cdot 8H_2O$ (5 mol%).

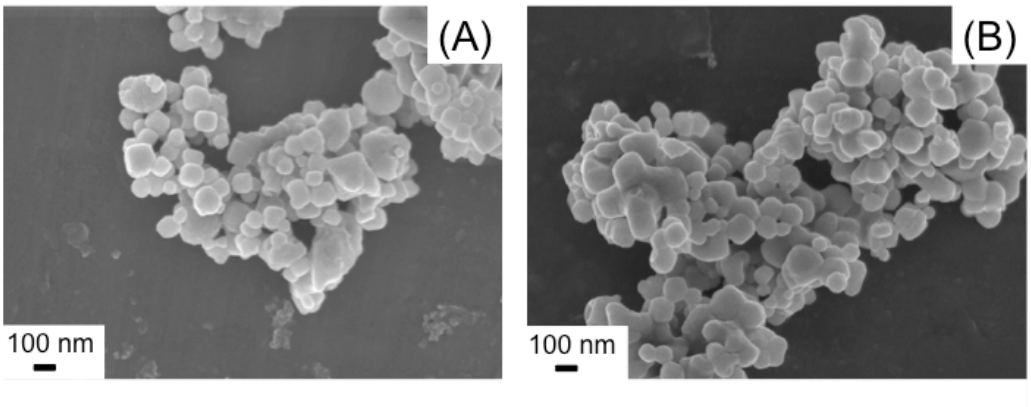

Fig. S4. SEM images of $BaTiO_3$:Rh prepared (A)with and (B)without addition of an excess amount of $Ba(OH)_2 \cdot 8H_2O$ (10 mol%) in the HT process, further post-heated at 1173 K with an excess amount of $Ba(OH)_2 \cdot 8H_2O$ (5 mol%).

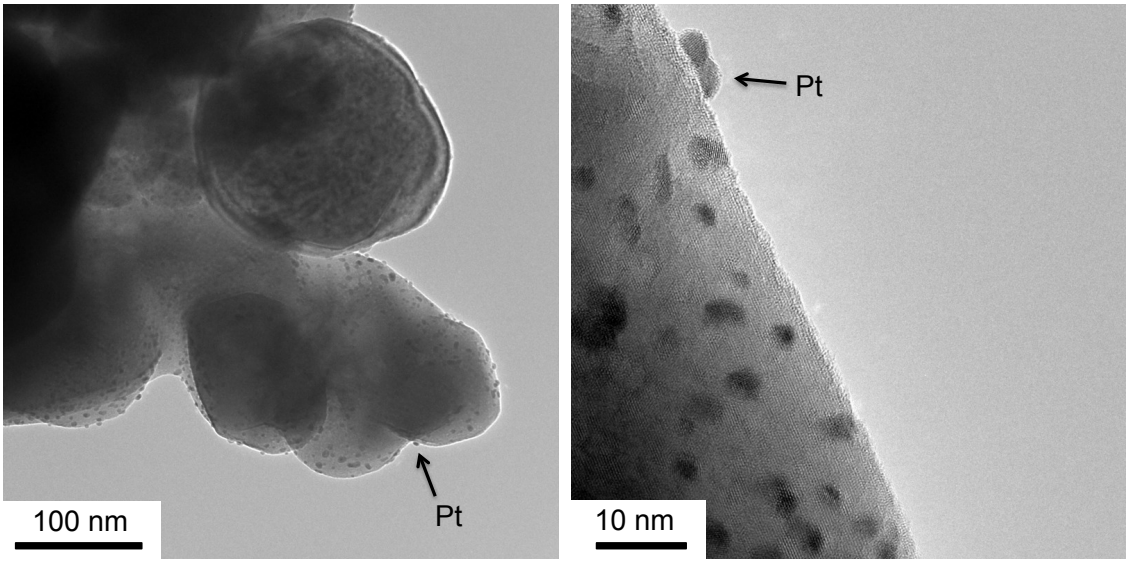

Fig. S5. TEM images of 0.5 wt% Pt-loaded $BaTiO_3$:Rh, which was prepared with addition of an excess amount of $Ba(OH)_2 \cdot 8H_2O$ (10 mol%) in the HT process, further post-heated at 1273 K with an excess amount of $Ba(OH)_2 \cdot 8H_2O$ (5 mol%).

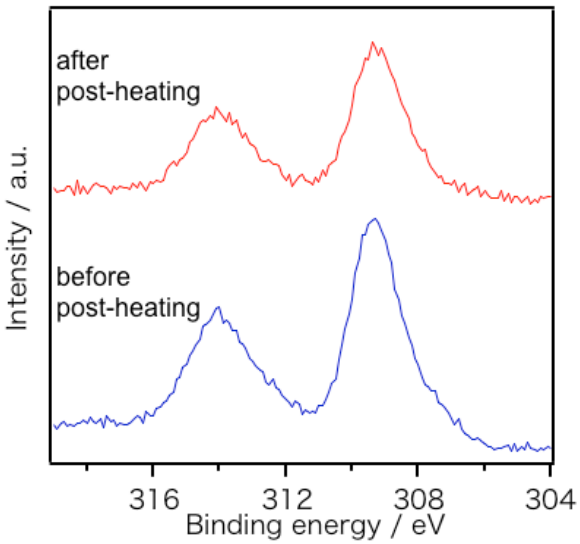

Fig. S6. XPS spectra for Rh 3d of $BaTiO_3$:Rh before and after post-heated at 1173 K in the presence of an additional $Ba(OH)_2 \cdot 8H_2O$ (5.0 mol.%).

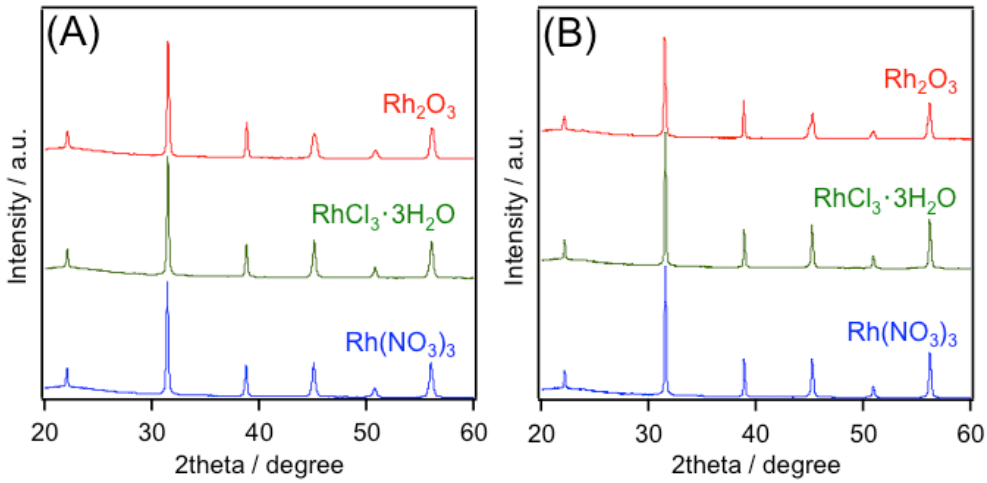

Fig. S7. XRD patterns of a hydrothermally synthesized $BaTiO_3$:Rh with different Rh sources. (A) before and (B) after post-heating at 1173 K.

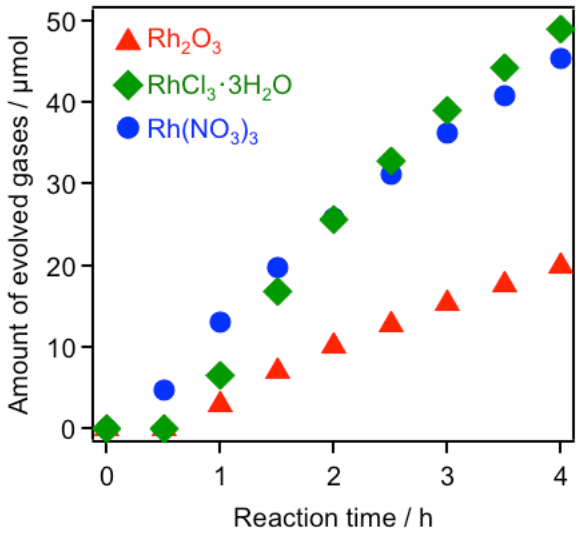

Fig. S8. Time courses of H_2 evolution from an aqueous methanol solution using Pt/$BaTiO_3$:Rh with different Rh sources under visible light (λ > 420 nm). Reaction conditions: catalyst, 100 mg; aqueous methanol solution (10 vol%, 100 mL); light source, xenon lamp (300 W) with a cold minor (CM-1) and a cutoff filter (L42); reaction vessel, Pyrex top-irradiation type. These samples were post-heated at 1173 K.