

## Supporting Information

### "Rhodium-doped Titania Photocatalysts with Two-step Bandgap Excitation by Visible Light—Influence of the Dopant Concentration on Photosensitization Efficiency"

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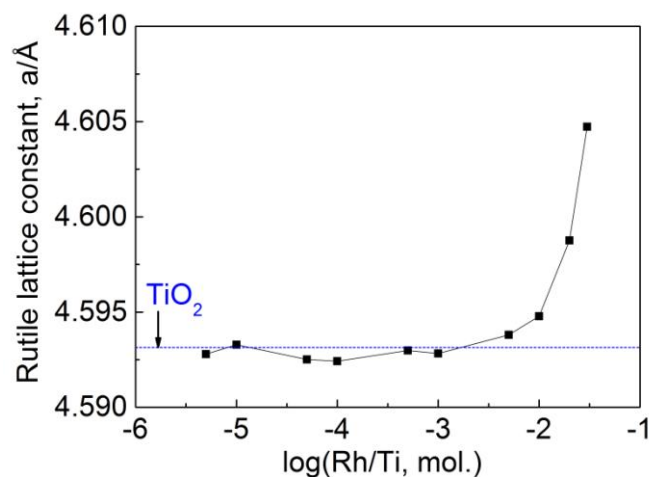


Figure 1S. The changes in rutile lattice constant (a) with Rh concentration.

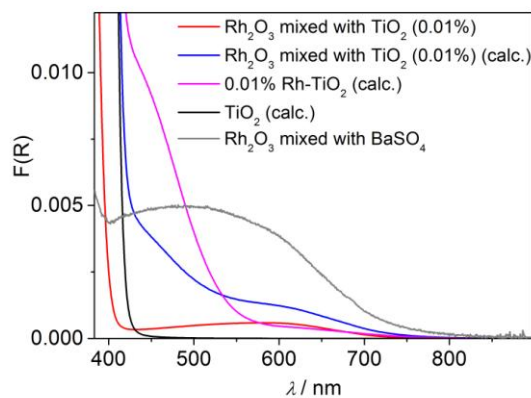


Figure 2S. Diffuse reflectance spectra of Rh<sub>2</sub>O<sub>3</sub> mixed with titania species, Rh<sub>2</sub>O<sub>3</sub> mixed with titania species and calcined at 700 °C for 3 h (0.0% of Rh), bare calcined TiO<sub>2</sub>, 0.01% Rh-TiO<sub>2</sub> material and Rh<sub>2</sub>O<sub>3</sub> mixed with BaSO<sub>4</sub>

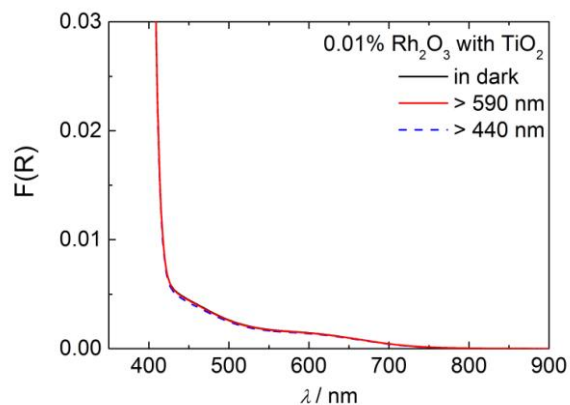


Figure 3S. Diffuse reflectance spectra in the representation of Kubelka Munk function ( $F(R)$ ) of the mixture of 0.01%  $Rh_2O_3$  with  $TiO_2$  material calcined at 700 °C (3 h) kept in the dark (black) and irradiated with the light in the ranges: 440-730 nm (blue), and 590-730 nm (red).

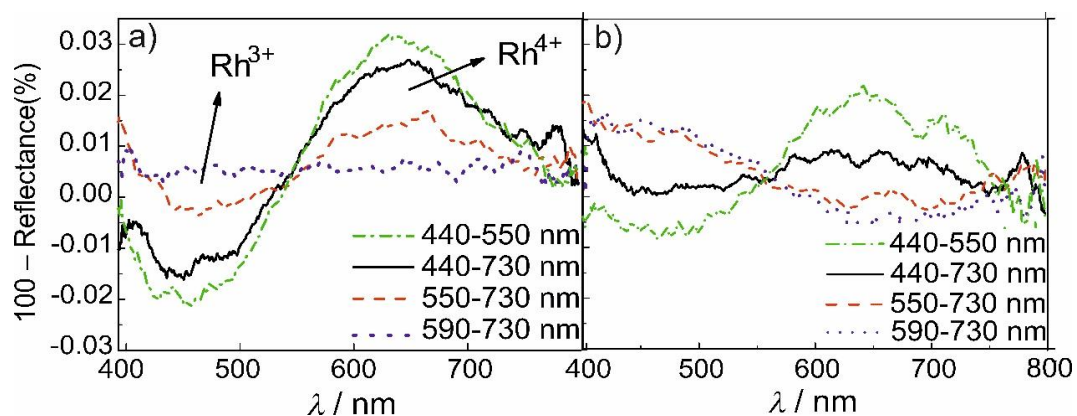


Figure 4S. Differential absorption spectra of 0.01% Rh- $TiO_2$  (with reference to the spectrum of the sample kept in a dark) under photoirradiation in the absence (a) and presence of AcH (b) in air with light of various wavelength ranges.

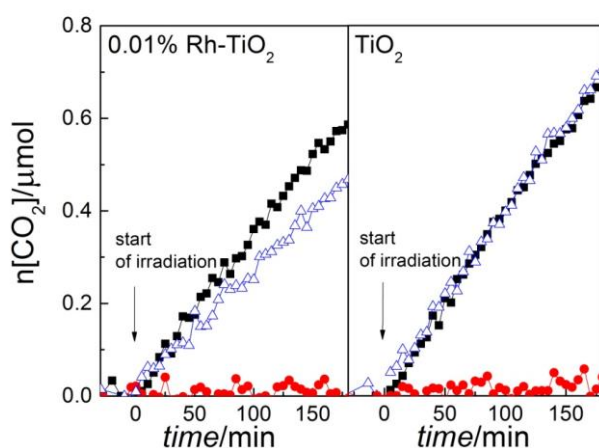


Figure 5S. Amounts of  $CO_2$  generated in the process of AcH oxidative decomposition in the presence of 0.01% Rh- $TiO_2$  (left), and bare  $TiO_2$  (right), under irradiation with various light ranges ([440-550 nm + 590-730 nm] – black squares, [440-550 nm] – blue triangles [590-730 nm] – red circles).

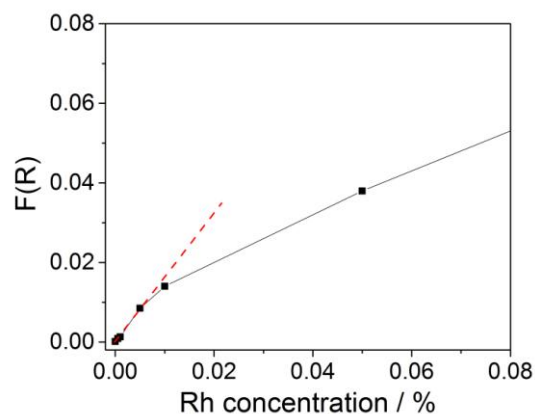


Figure 6S. The changes in the KM function value at 440 nm determined for the samples containing various Rh concentrations.

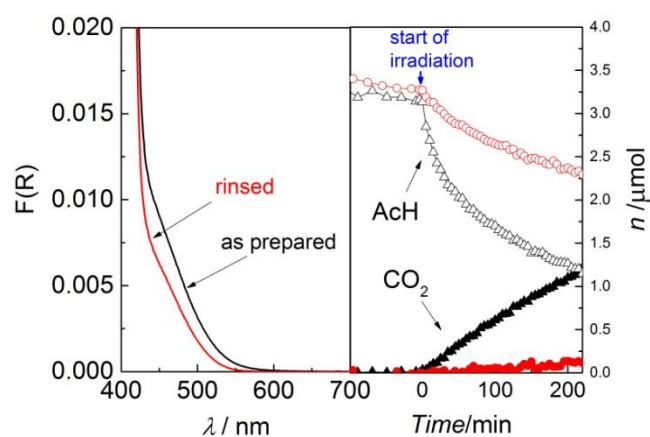


Figure 7S. Diffuse reflectance spectra in the representation of Kubelka Munk function ( $F(R)$ ) of 0.001% Rh-TiO<sub>2</sub> as received (black) and rinsed four times with water (red) (left). Amounts of CO<sub>2</sub> and AcH monitored during process of AcH oxidative decomposition in the presence of 0.001% Rh-TiO<sub>2</sub> as received (black) and rinsed four times with water (red) under irradiation with visible light ( $> 440$  nm) (right).

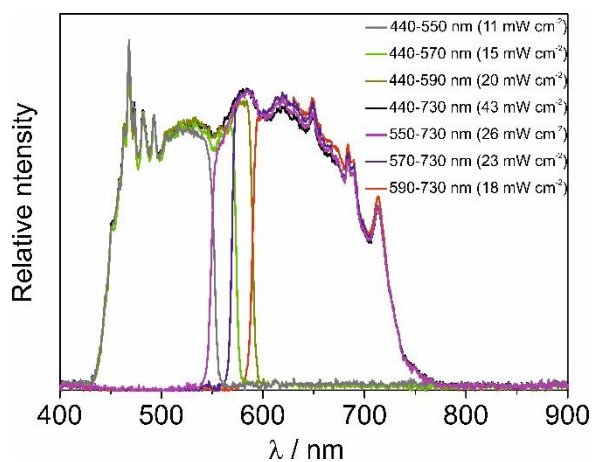


Figure 8S. The spectra of used Xe lamp with various optical filters. The values of light intensities estimated for each wavelength range are in brackets.