

Supplementary Information

Wavelength- and Efficiency-Tunable Plasmon-Induced Charge Separation by the Use of Au-Ag Alloy Nanoparticles

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Preparation of Au-Ag Alloy Nanoparticles

Au-Ag alloy nanoparticles with $x = 0.25, 0.50, 0.70$ and 0.90 were prepared as follows. Aqueous AgNO_3 (5.89 mM , $a \text{ }\mu\text{L}$), aqueous trisodium citrate (9.30 mM , 3.33 mL) and ultrapure water ($b \text{ mL}$) were mixed together according to Table S1, and then the mixed solution was heated at $90 \text{ }^\circ\text{C}$ for 10 min . To the solution was quickly added an aqueous solution containing $\text{HAuCl}_4 \cdot 4\text{H}_2\text{O}$ (2.42 mM , $266 \text{ }\mu\text{L}$) with vigorous stirring. After 10 min , aqueous $\text{HAuCl}_4 \cdot 4\text{H}_2\text{O}$ (2.42 mM , $c \text{ mL}$) was quickly added with vigorous stirring in 10 portions ($c/10 \text{ mL} \times 10$ times) with interval of 5 min according to Table S1. After 5 min , the reaction solution was cooled to room temperature. Nanoparticles with $x = 0$ and 1 (Ag and Au nanoparticles) were not obtained by the present procedure.

Table S1. The Values for a , b and c for the Preparation of Au-Ag Alloy Nanoparticles with Different x Values

X	a	b	c
0.25	866	5.10	0.43
0.50	578	4.69	1.13
0.70	347	4.39	1.69
0.90	116	4.03	2.25

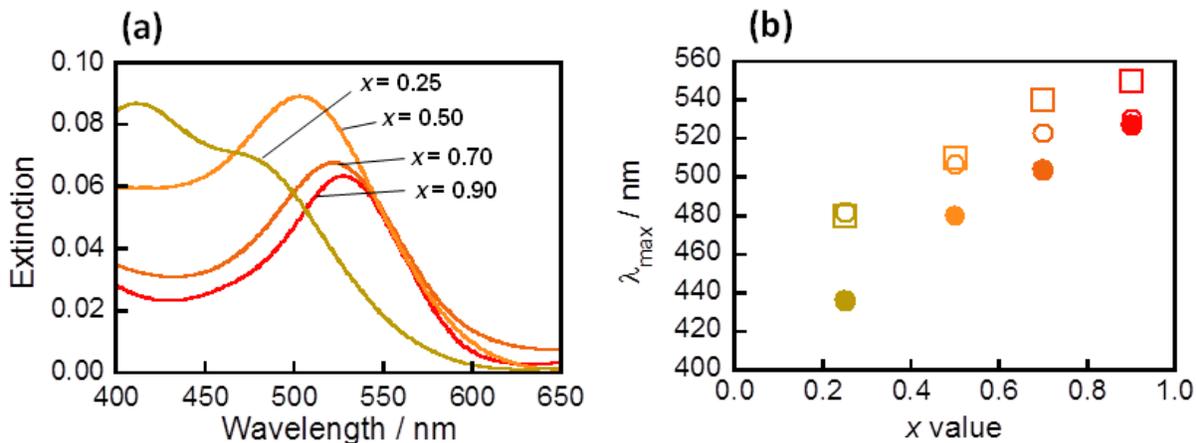


Fig. S1 (a) Extinction spectra of the TiO₂ electrodes loaded with the Au-Ag alloy NPs measured in water. (b) Dependence on the x value of the extinction peak wavelength of the alloy NPs in water (solid circles), that of the alloy NPs on TiO₂ in water (open circles) and the photocurrent peak wavelength of the TiO₂ electrode modified with the alloy NPs in the electrolyte (open squares).

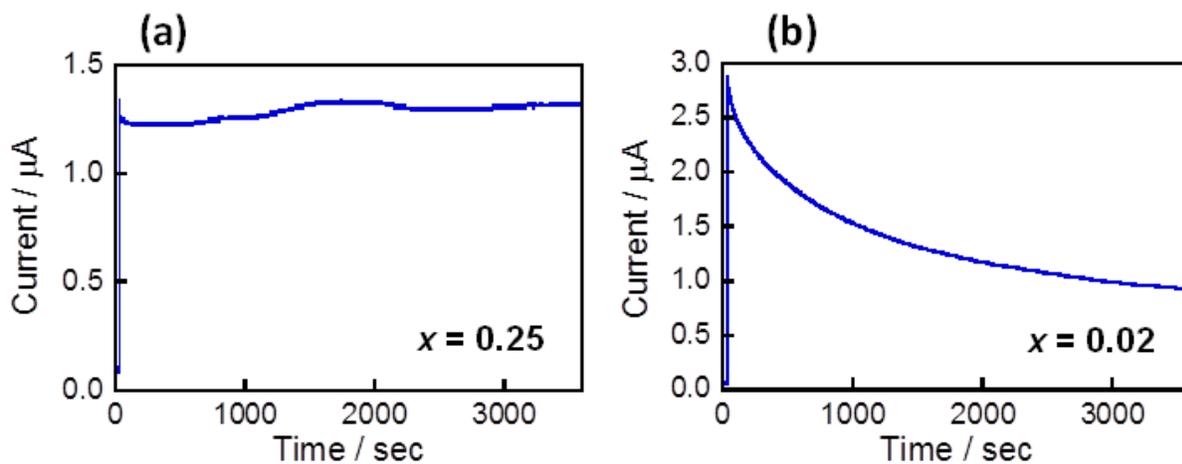


Fig. S2 Time courses of photocurrents of the TiO₂ electrodes loaded with the Au-Ag alloy NPs ($x = 0.25$ and 0.02) upon irradiation at 480 nm (a) and 440 nm (b).