

Electronic Supporting Information

Gold Photosensitized SrTiO₃ for Visible-Light Water Oxidation

Induced by Au Interband Transitions

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Material Preparation.

Au NPs and nanopowder preparation or information

Au NPs with diameter of about 3 nm: typically this involves the preparation of a 20 mL aqueous solution containing 2.5×10^{-4} M HAuCl₄ and 2.5×10^{-4} M trisodium citrate. To this solution was added 0.6 mL of ice cold 0.1 M NaBH₄ with stirring. The solution immediately turned orange-red, indicating the formation of gold nanoparticles. The average particle size measured from transmission electron microscopy was about 3 nm.¹

Au nanopowder used in valence band measurement was purchased from Nanostructured & Amorphous Materials Inc (USA). Basic parameters are as follows: particle size: 50 nm; purity: 99.99%, surface area: 3 m²/g.

1. N. R. Jana, L. Gearheart and C. J. Murphy, *J. Phys. Chem. B*, 2001, 105, 4065-4067.

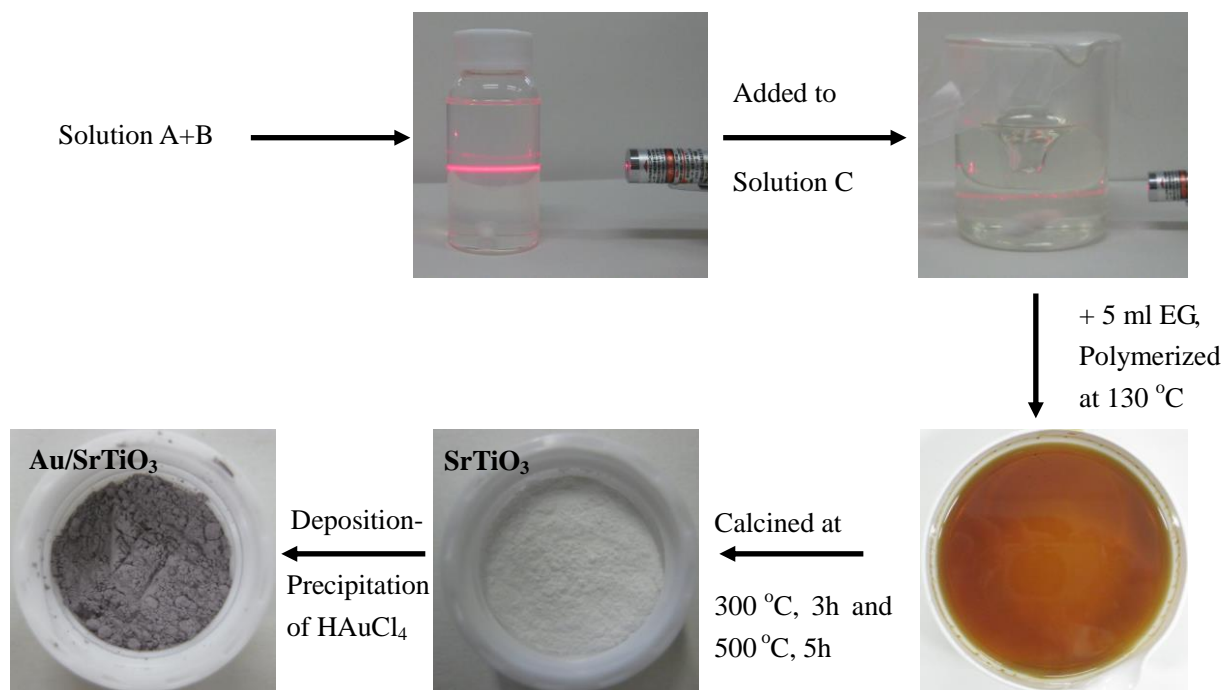


Fig. S1. Schematic illustration of the synthetic procedure of SrTiO₃ and Au/SrTiO₃.

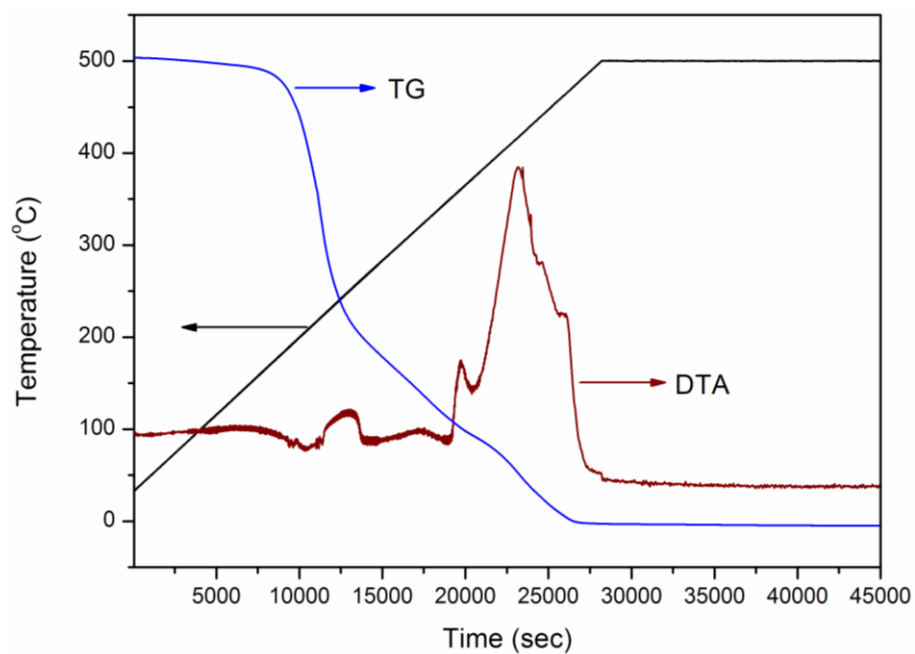


Fig. S2. TG-DTA plots of the SrTiO₃-organic polymer precursor.

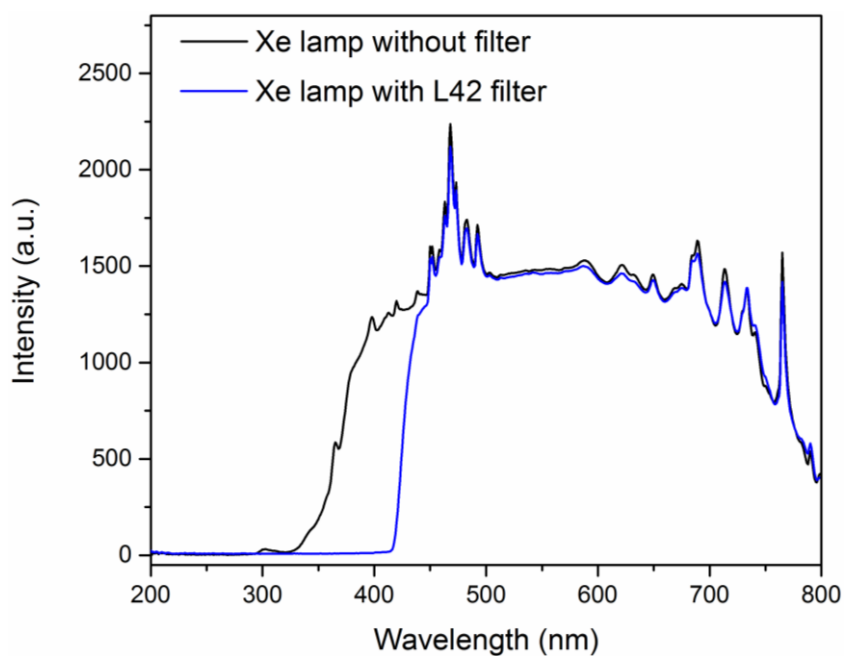


Fig. S3. Spectra of Xe lamp with and without L42 cutoff filter.

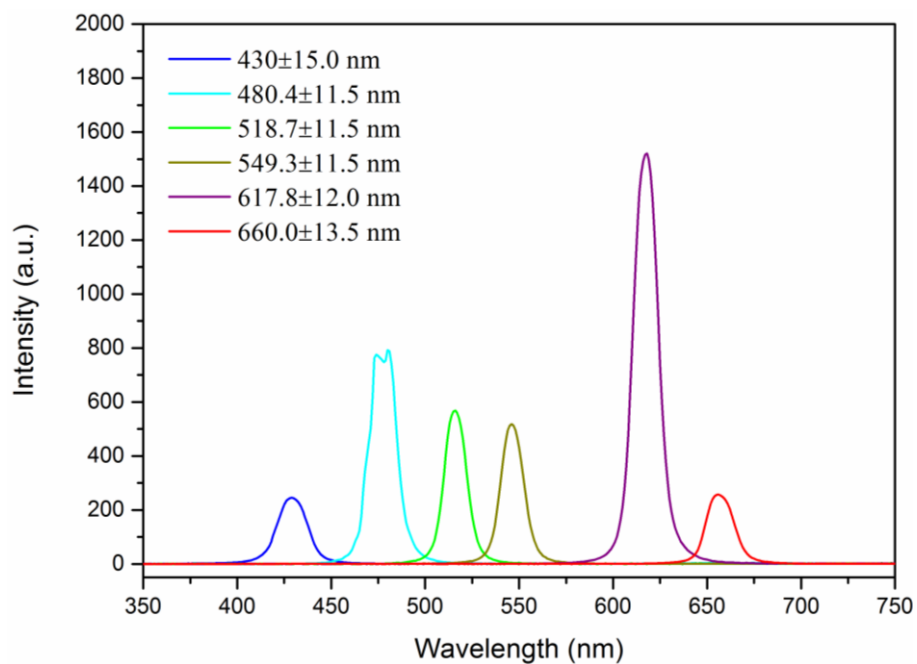


Fig. S4. Spectra of Xe lamp with water filter and various bandpass filters.

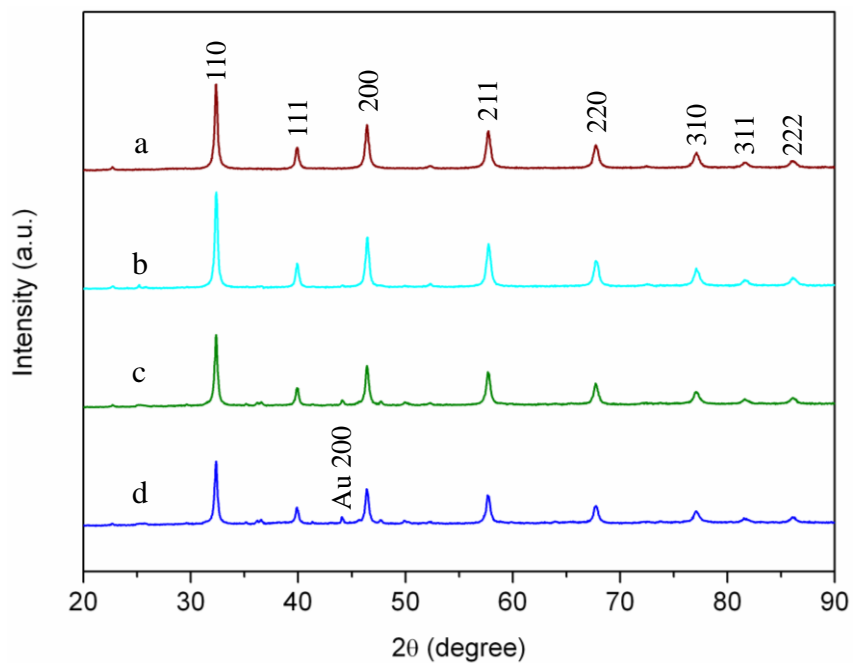


Fig. S5. XRD patterns of SrTiO_3 (a), 0.49% Au/SrTiO₃ (b), 1.1 % Au/SrTiO₃ (c) and 3.0 %

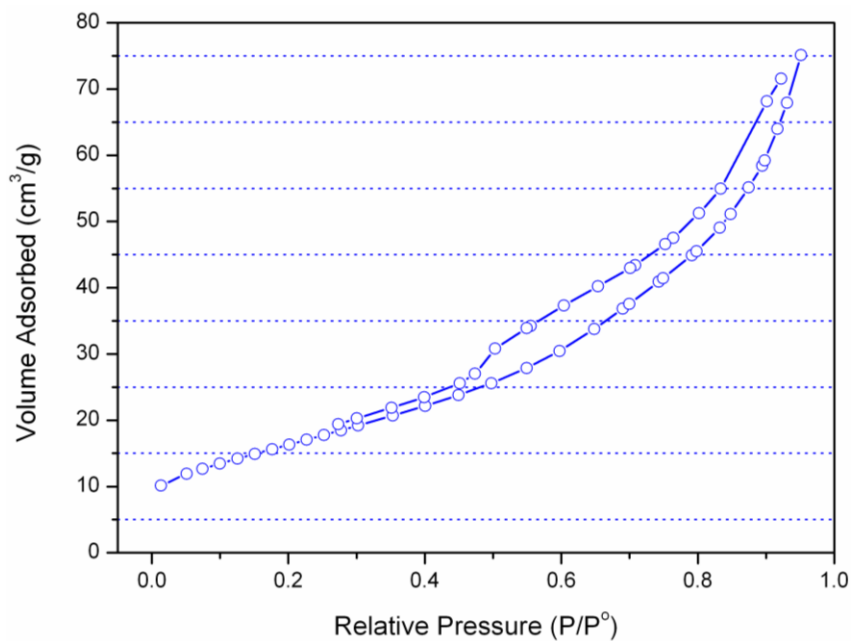
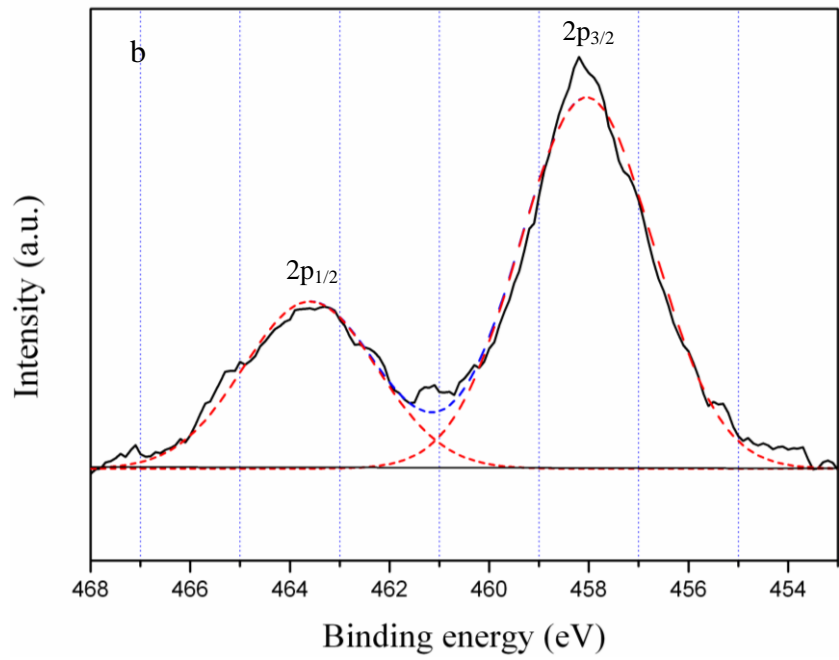
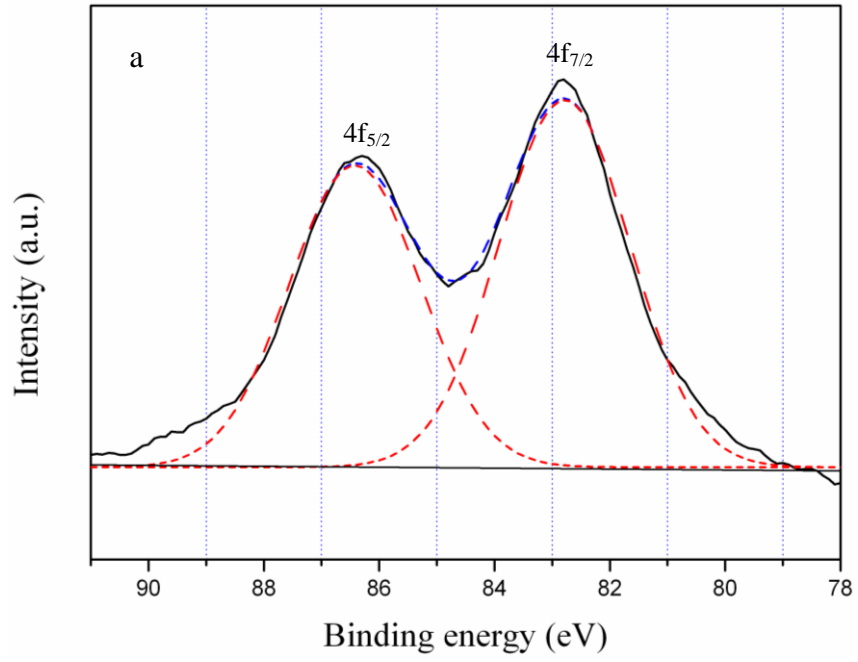


Fig. S6. Nitrogen physisorption isotherms of 1.1% Au/SrTiO₃



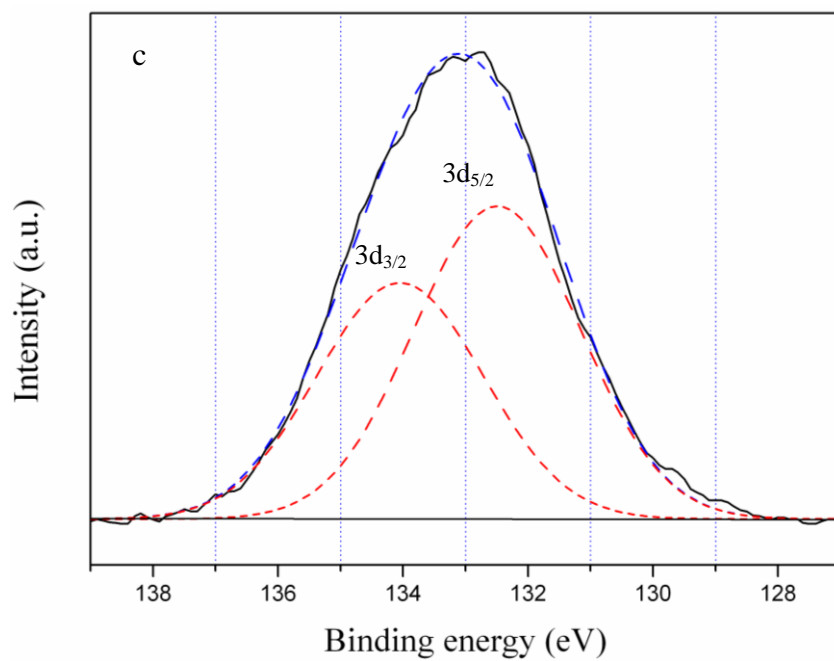


Fig. S7. XPS binding energy of (a) Au, (b) Ti and (c) Sr of 1.1% Au/SrTiO₃

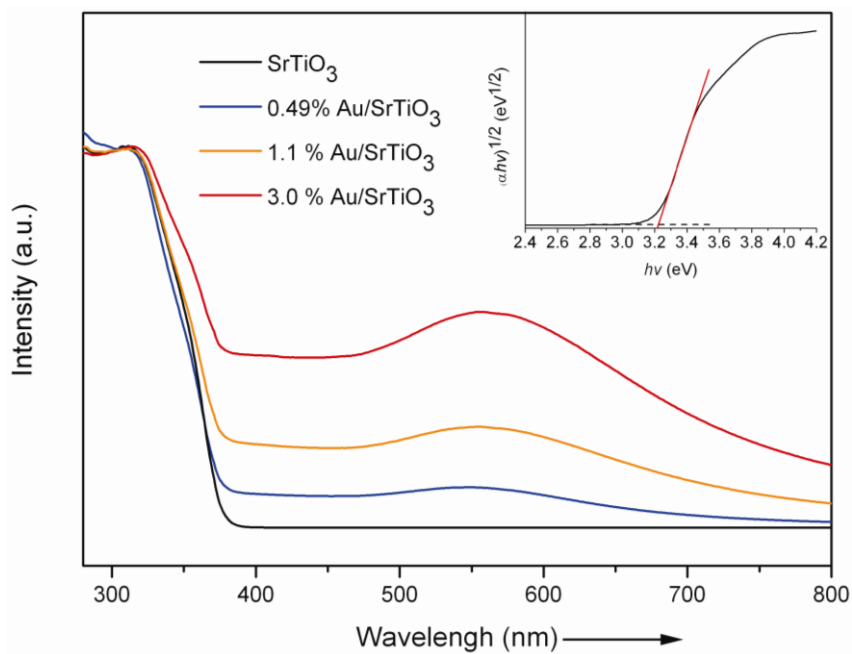


Fig. S8. Normalized UV-vis diffusion reflectance absorption spectra of SrTiO₃ and a series of Au/SrTiO₃ photocatalysts with different Au loadings. Inset: Tauc plot of SrTiO₃