Supplementary Information

Stable Au-Ag nanoframes based on Au nanorods: Construction and plasmon enhanced catalytic performance

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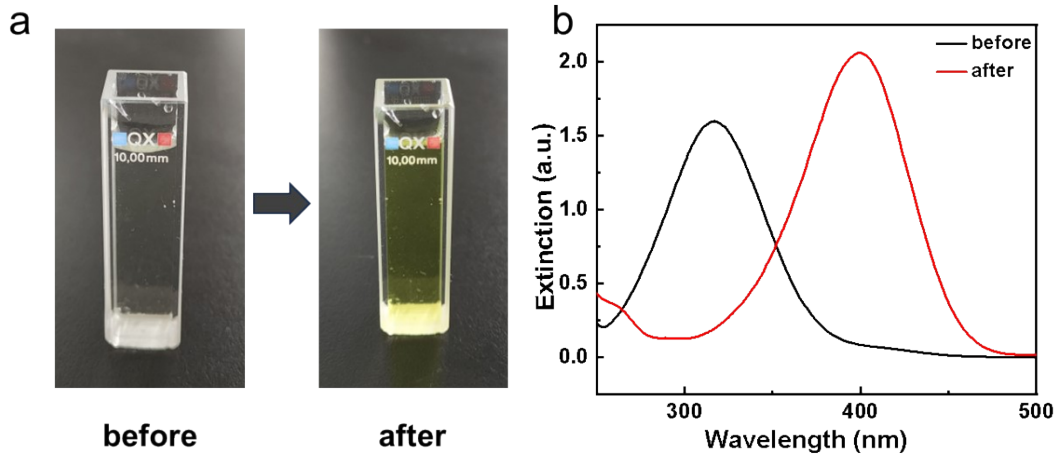

Figure S1. (a) Color changes for 4-NP solution before and after the addition of $NaBH_4$. (b) UV–vis spectram of 4-NP before and after the addition of $NaBH_4$.

Note: The apparent rate constant K_{app} is proportional to the surface area of metal NPs, which could be defined as follow:

$$\frac{dC_t}{dt} = K_{app}C_t = KSC_t$$

where C_t is 4-NP concentration at time (t); K is the rate constant normalized to S, S is the total surface area normalized to the unit volume of catalysts.

Large excess of $NaBH_4$ was used to assure that pseudo first order kinetic conditions could be performed to acquire reaction rate constants.

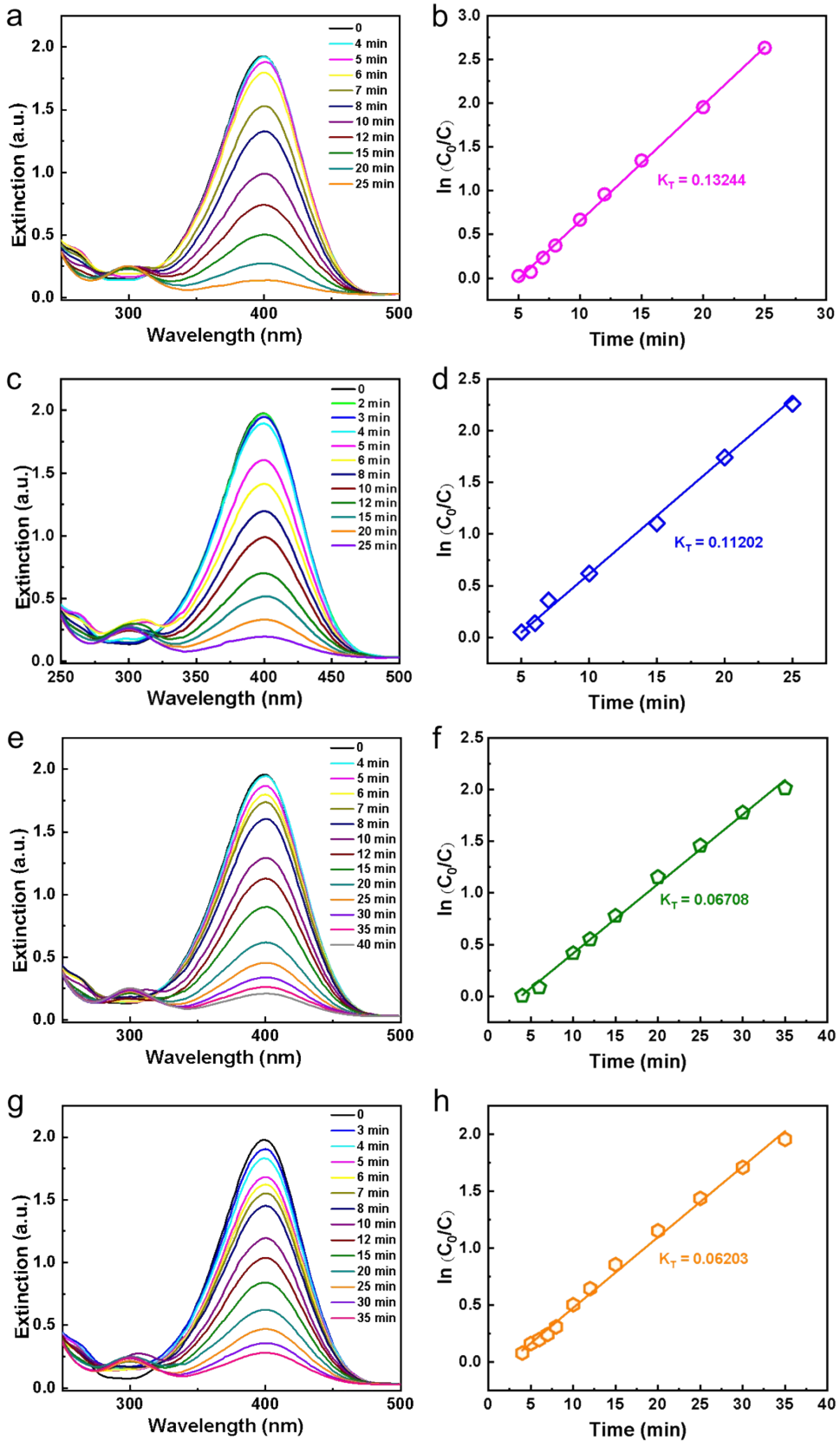

Figure S2. Extinction spectram of 4-NP reduced by $NaBH_4$ in the presence of Au NR @ Au-Ag nanoframes (the Au NR @ Au-Ag nanoframes prepared with increasing amounts of $HAuCl_4$, as defined "F1, F2, F3, F4") and $\ln(C_0/C)$ vs time plot for determination of rate constants of these NPs. All results were obtained in the dark under 300 K. (a, b) F1, (c, d) F2, (e, f) F3, (g, h) F4.

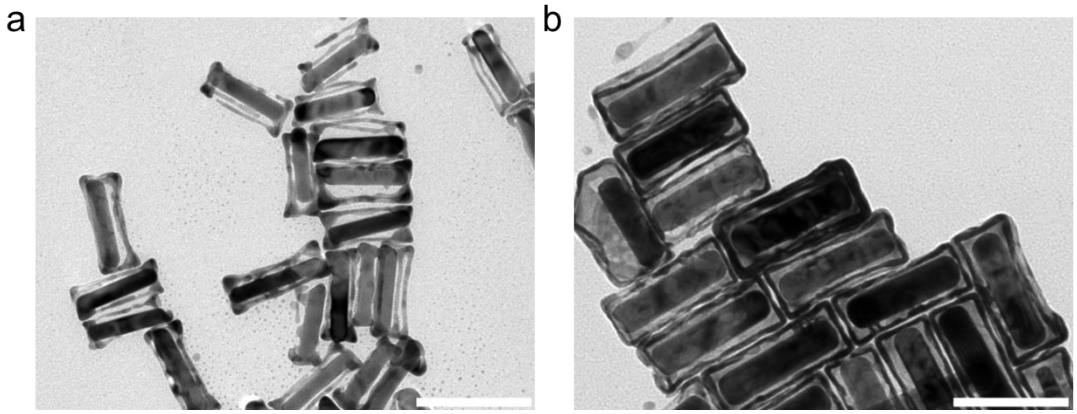

Figure S3. TEM images of the Au NRs and Au NR @ Ag nanocuboids prepared with increasing amounts of $HAuCl_4$ solution (scale: 100 nm).

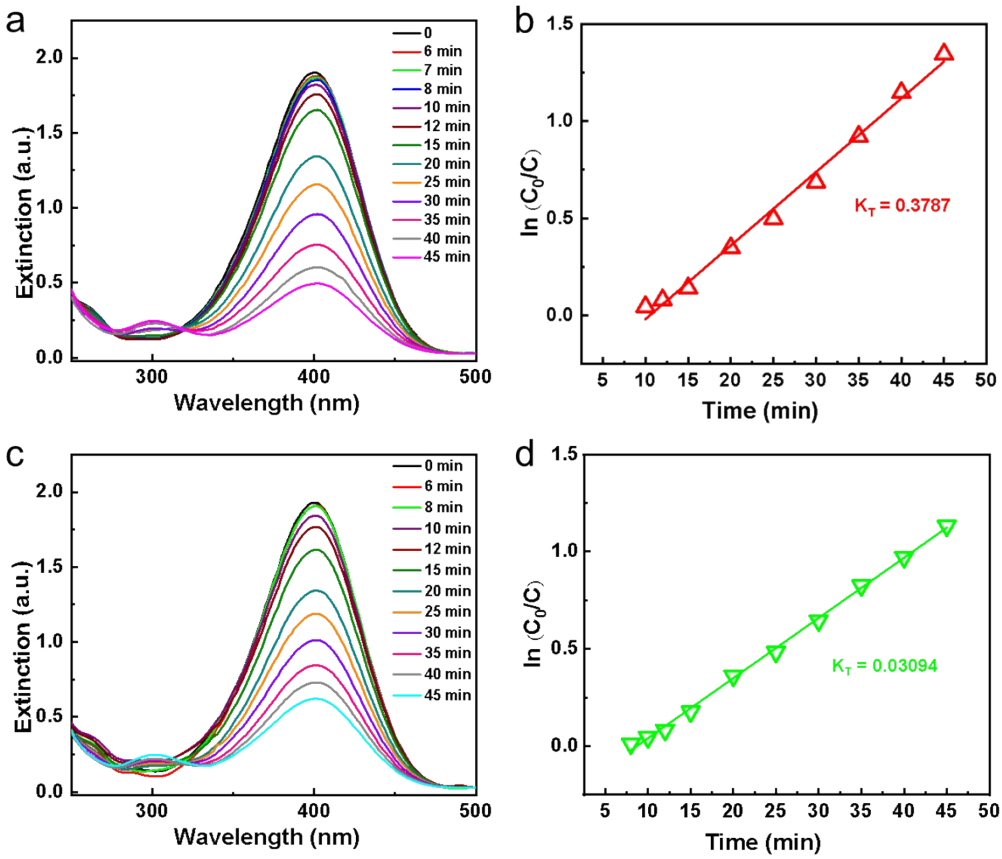

Figure S4. Extinction spectram of 4-NP reduced by $NaBH_4$ in the presence of Au NRs and Au-Ag nanorods and $\ln(C_0/C)$ vs time plot for determination of rate constants of these NPs. All results were obtained in the dark under 300 K. (a, b) Au NRs, (c, d) Au-Ag nanorods.

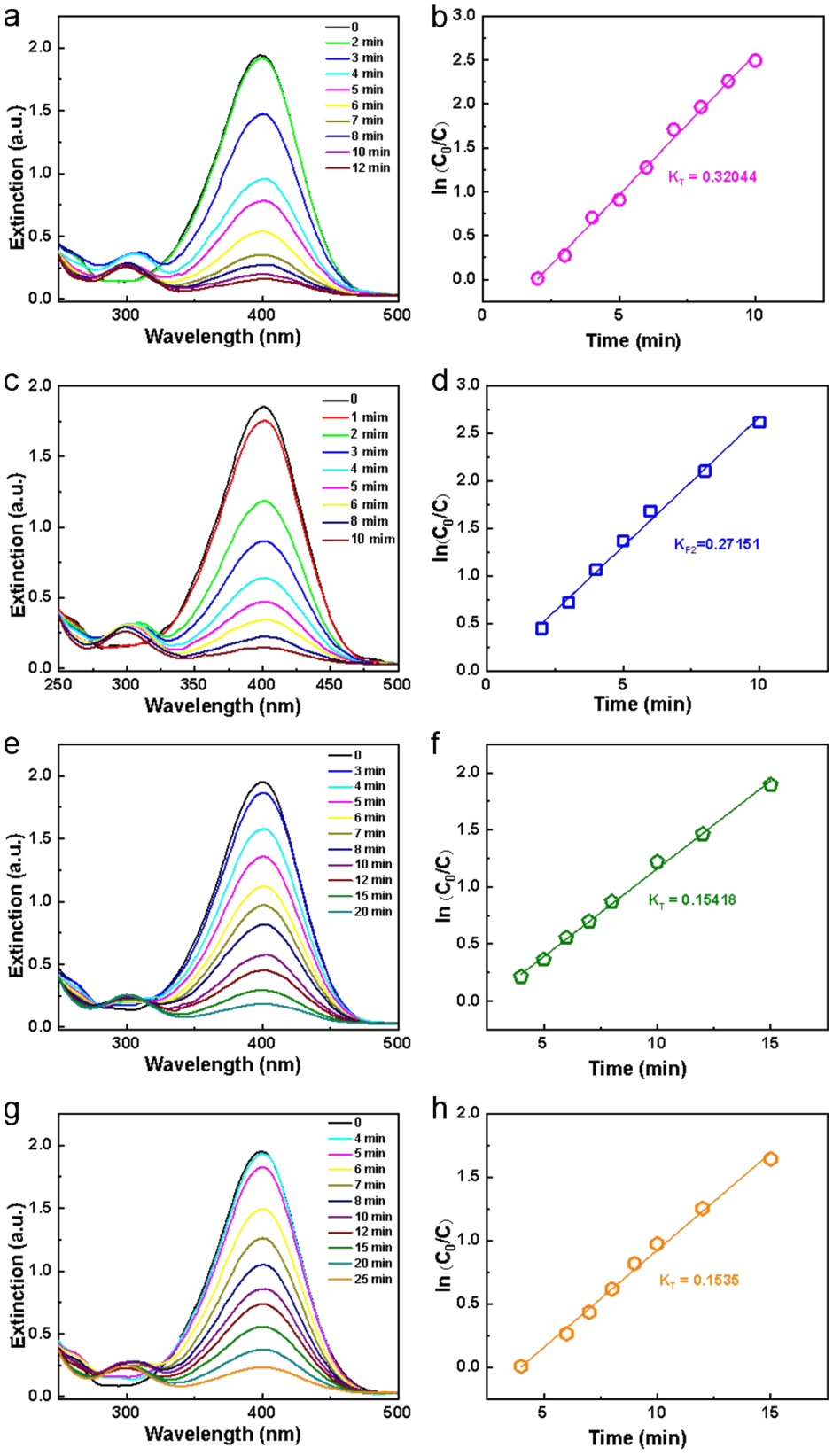

Figure S5. Extinction spectram of 4-NP reduced by $NaBH_4$ in the presence of Au NR @ Au-Ag nanoframes (the Au NR @ Au-Ag nanoframes prepared with increasing amounts of $HAuCl_4$, as defined "F1, F2, F3, F4") and $\ln(C_0/C)$ vs time plot for determination of rate constants of these NPs. All results were obtained with irradiation of light. (a, b) F1, (c, d) F2, (e, f) F3, (g, h) F4.

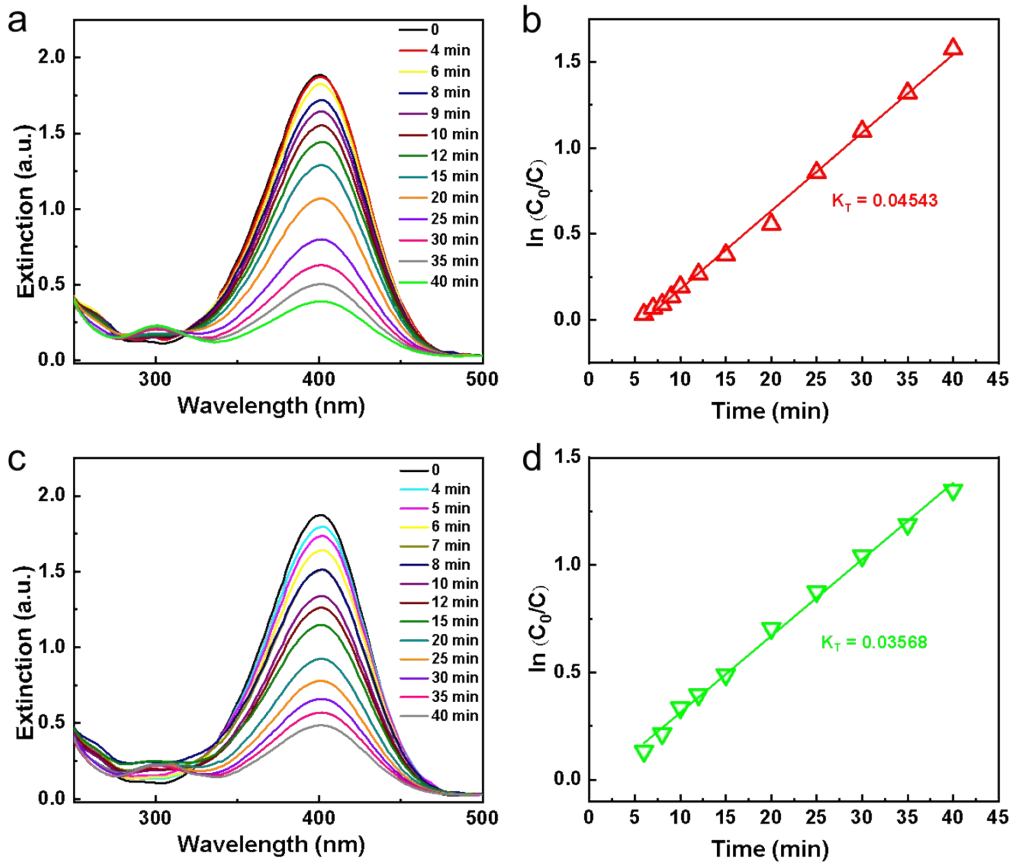

Figure S6. Extinction spectram of 4-NP reduced by $NaBH_4$ in the presence of Au NRs and Au-Ag nanorods and $\ln(C_0/C)$ vs time plot for determination of rate constants of these NPs. All results were obtained with irradiation of light. (a, b) Au NRs, (c, d) Au-Ag nanorods.

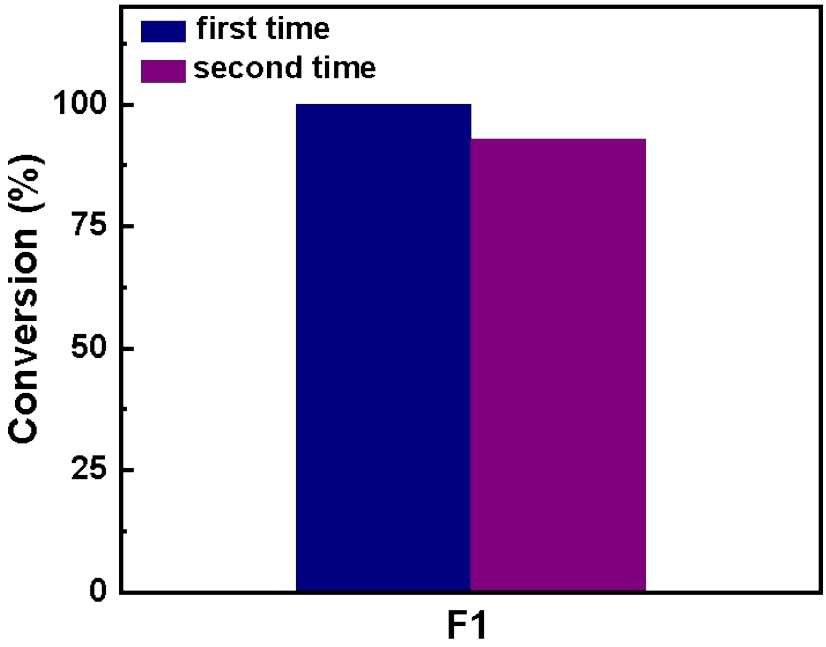

Figure S7. The recyclability of the Au NR @ Au-Ag nanoframes (F1) for the reduction of 4-NP with $NaBH_4$.

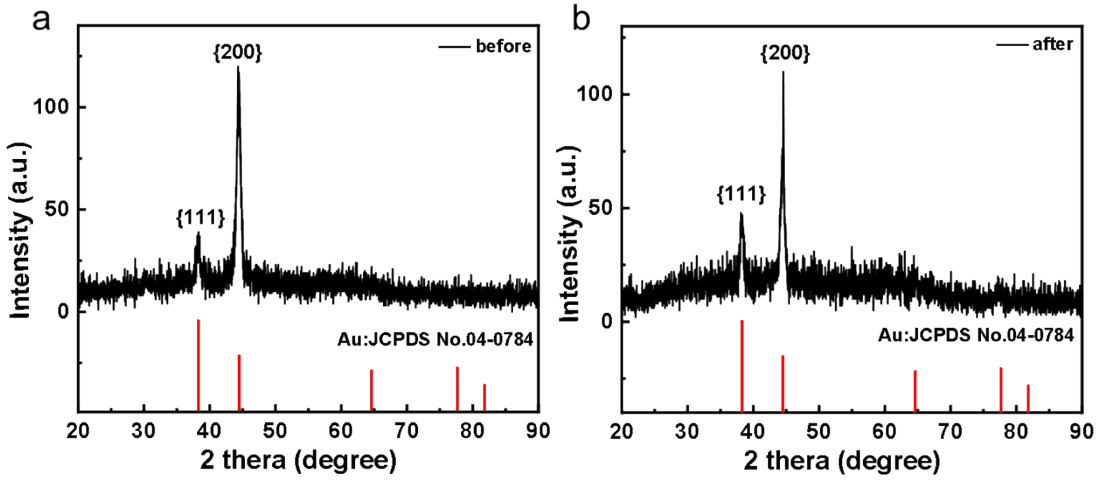

Figure S8. XRD patterns for Au NR @ Ag-Au nanoframes before and after the catalytic reaction.

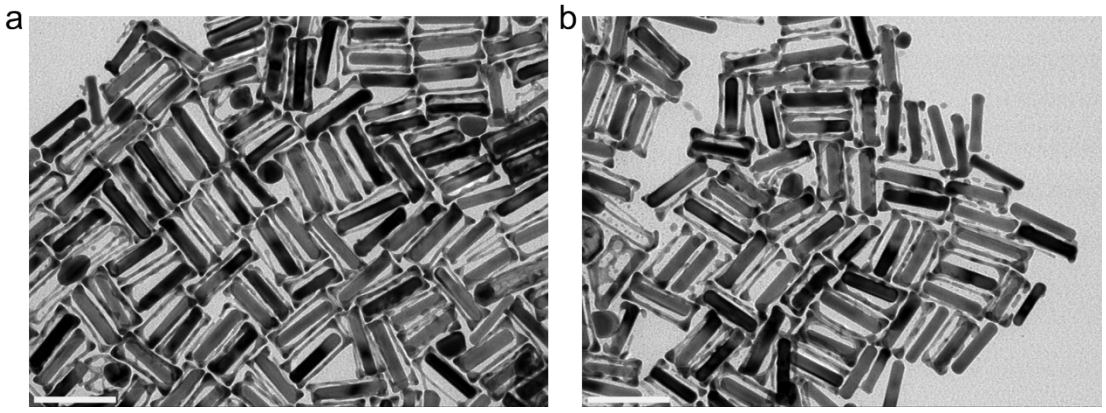

Figure S9. TEM images for Au NR @ Ag-Au nanoframes before and after the catalytic reaction (scale bar: 100 nm).

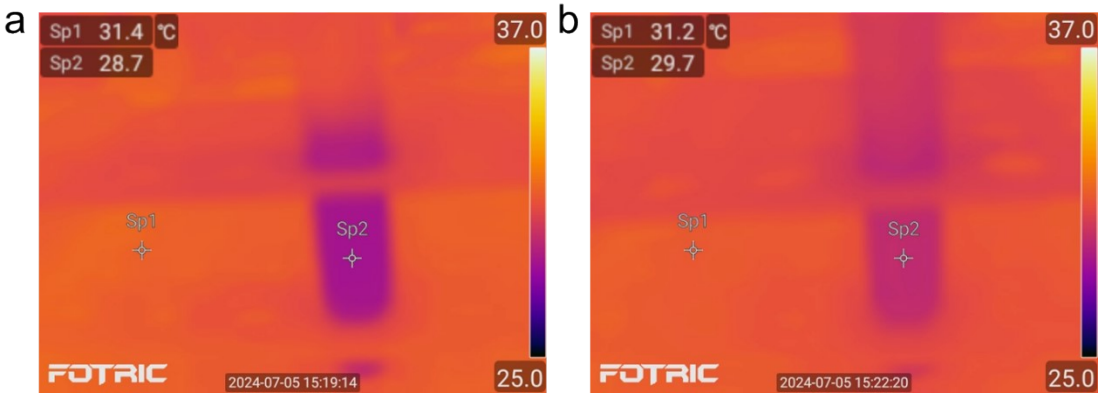

Figure S10. The temperature increased ~1℃ after 3 min of the catalytic reaction in the dark.

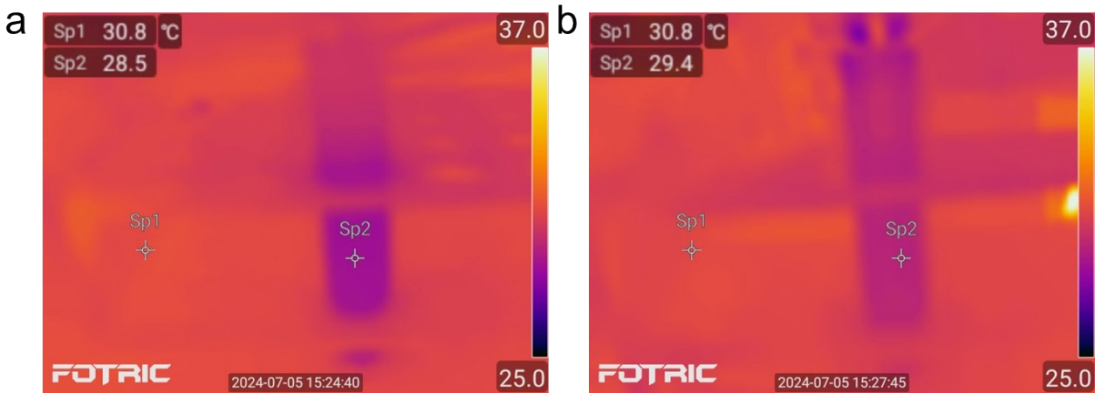

Figure S11. The temperature increased ~0.9℃ after 3 min of the catalytic reaction with irradiation of light.