Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Table S1. Calculation for the amount of Ag and Au atoms in Ag-Au bimetallic nanocomposites.

Elements	Amount of element (mg)	No. of atoms (atoms)	Atomic ratio (Ag:Au)
Ag NPs (800 µL)	0.0427	2.4×10^{17}	1:0
Au^{+3} (15 µL)	0.0147	0.45×10^{17}	1:0.2
Au^{+3} (25 µL)	0.0246	0.75×10^{17}	1:0.3
Au^{+3} (35 µL)	0.0344	1.05×10^{17}	1:0.4

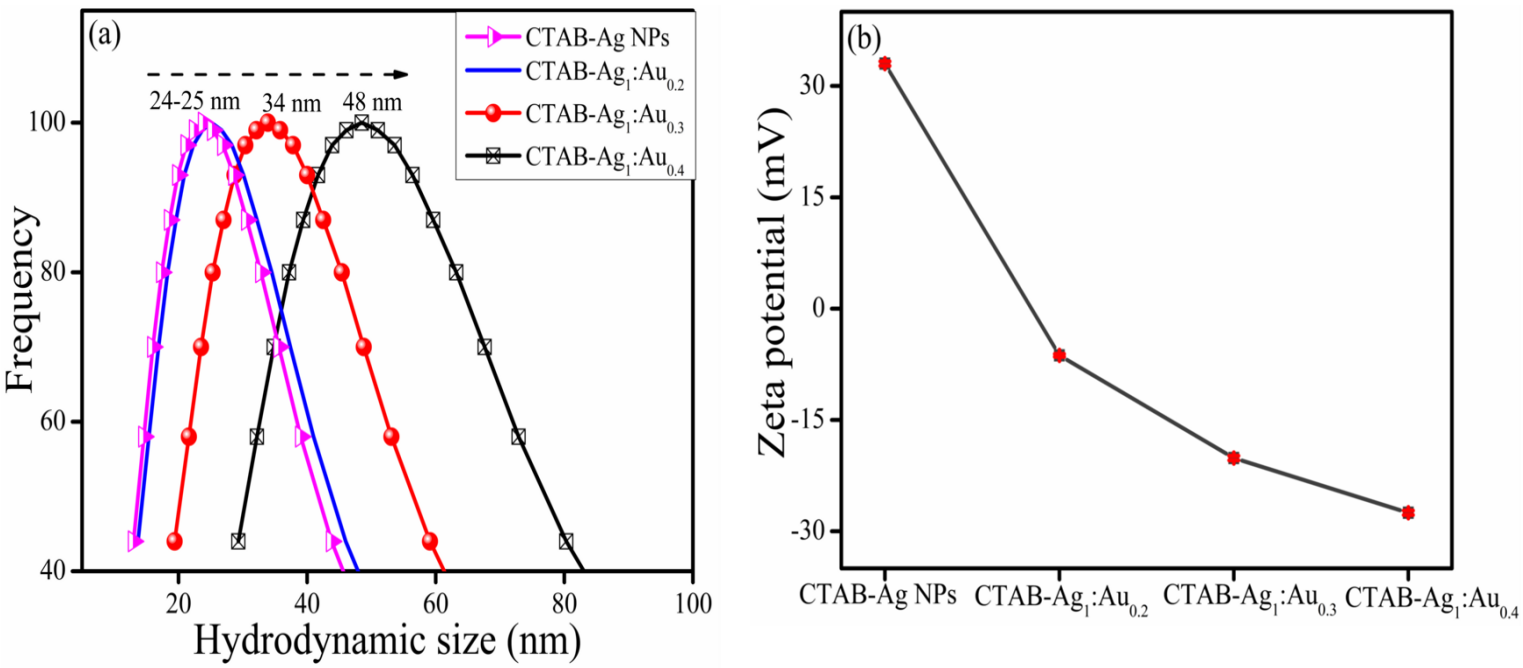

Fig. S2. (a) DLS particle size distribution, and (b) Zeta potential of CTAB-Ag nanoparticles after deposition of $HAuCl_4.3H_2O$ of different amounts (15-35 µL, 0.01 M) onto its surface.

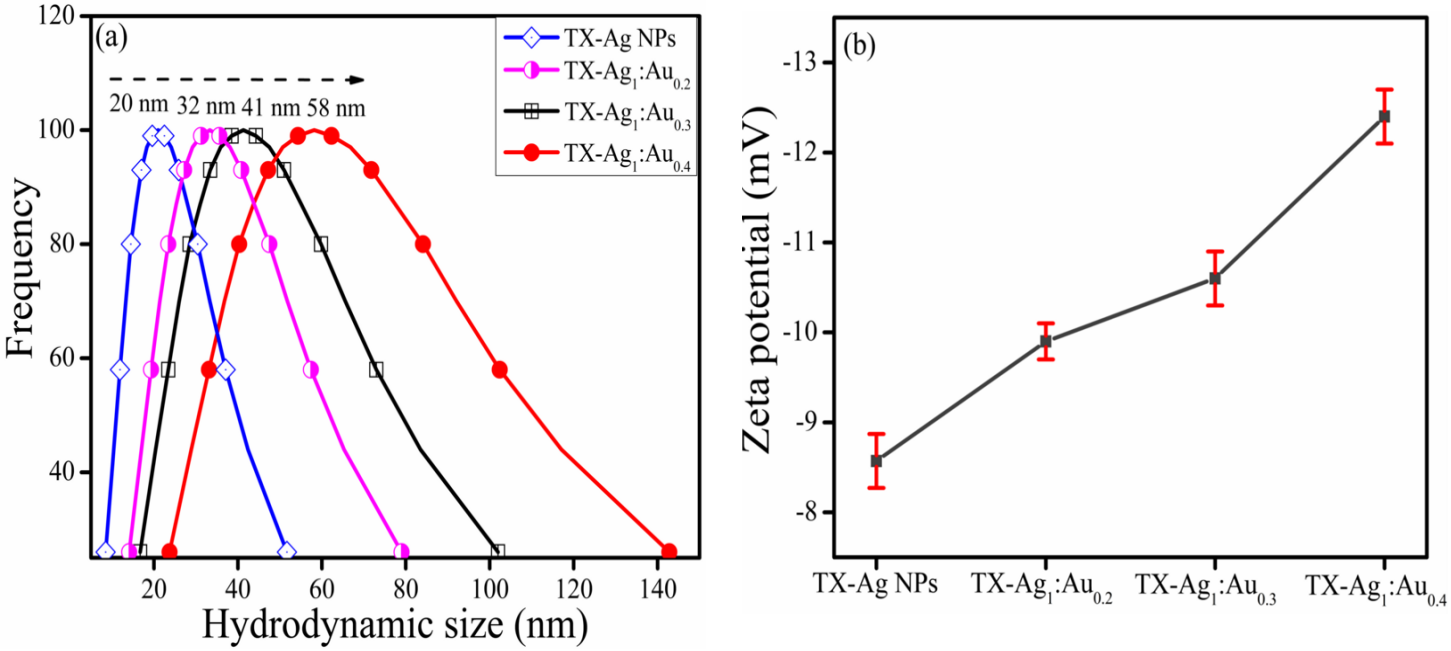

Fig. S3. (a) DLS particle size distribution, and (b) Zeta potential of TX-Ag nanoparticles after deposition of $HAuCl_4.3H_2O$ of different amounts (15-35 µL, 0.01 M) onto its surface.

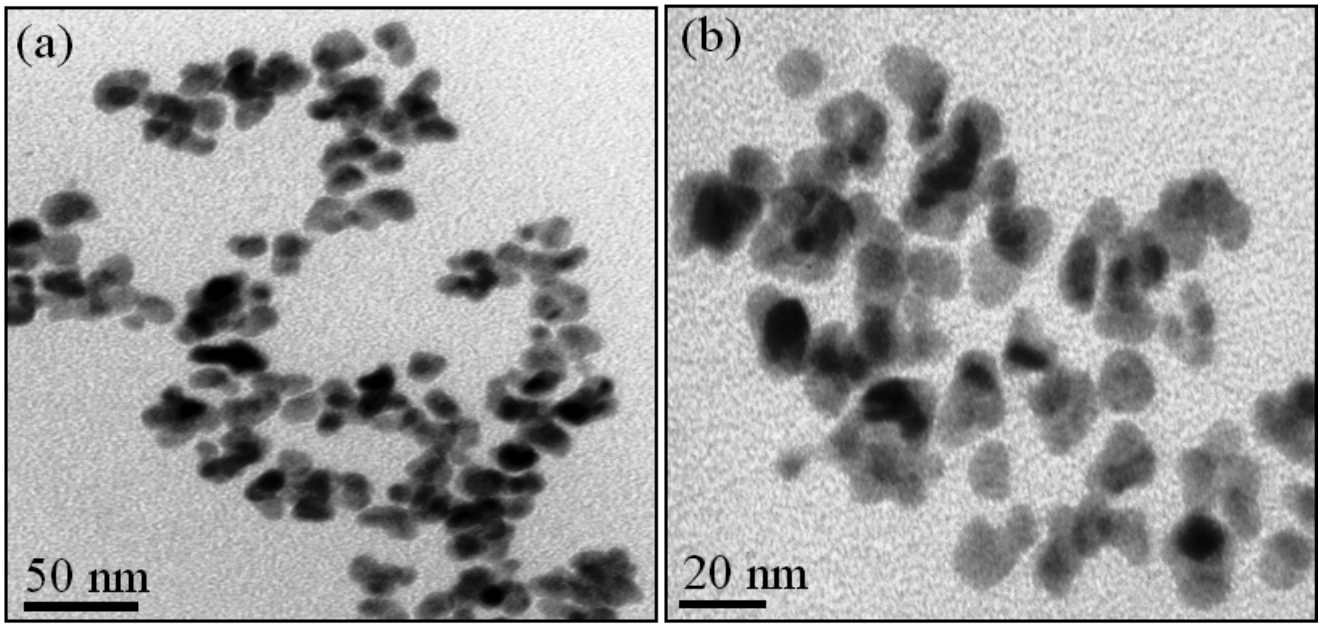

Fig. S4. TEM images of Au deposited CTAB-Ag nanoparticles.

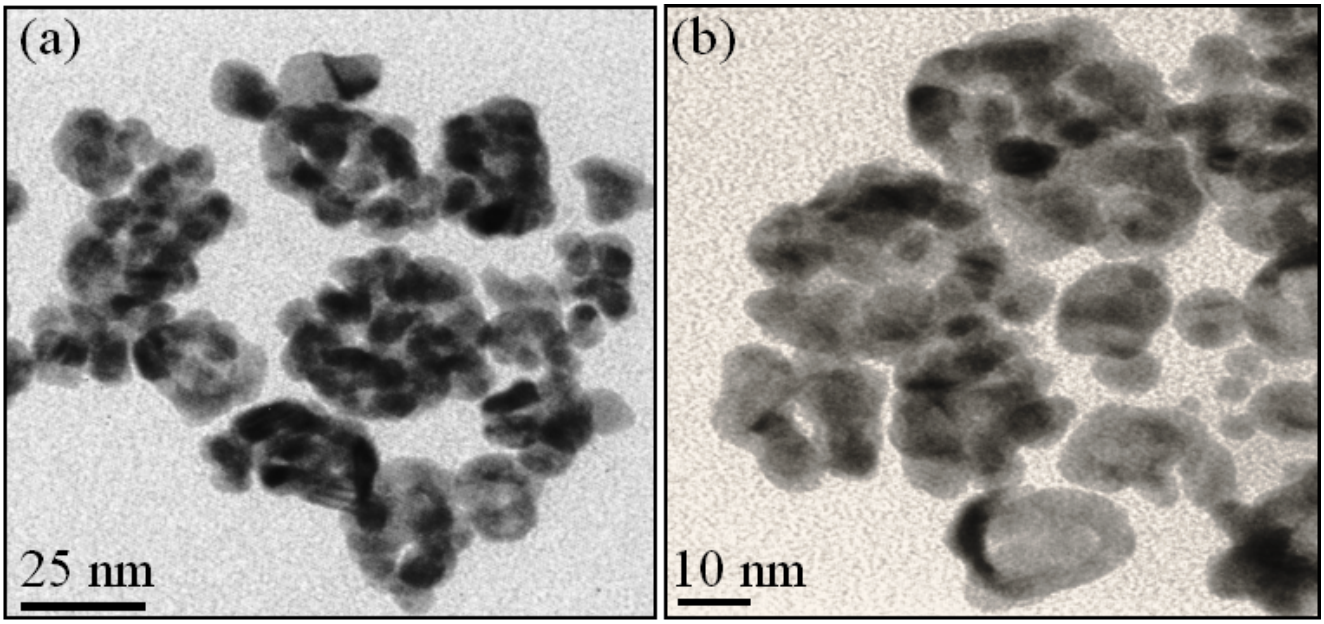

Fig. S5. TEM images of Au deposited TX-Ag nanoparticles.

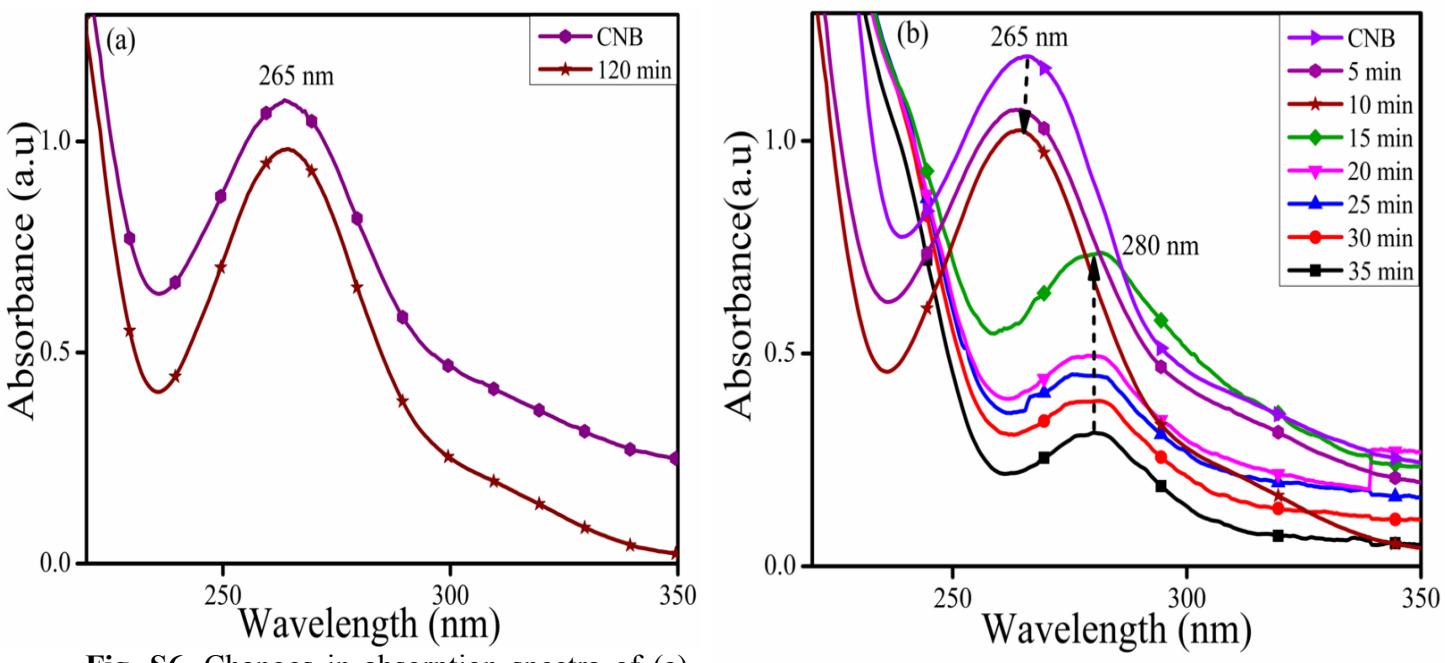

Fig. S6. Changes in absorption spectra of (a) m-chloronitrobenzene reduction by $NaBH_4$ in the absence of nanoparticles, and (b) m-chloronitrobenzene reduction by $NaBH_4$ in the presence of various Ag nanoparticles.

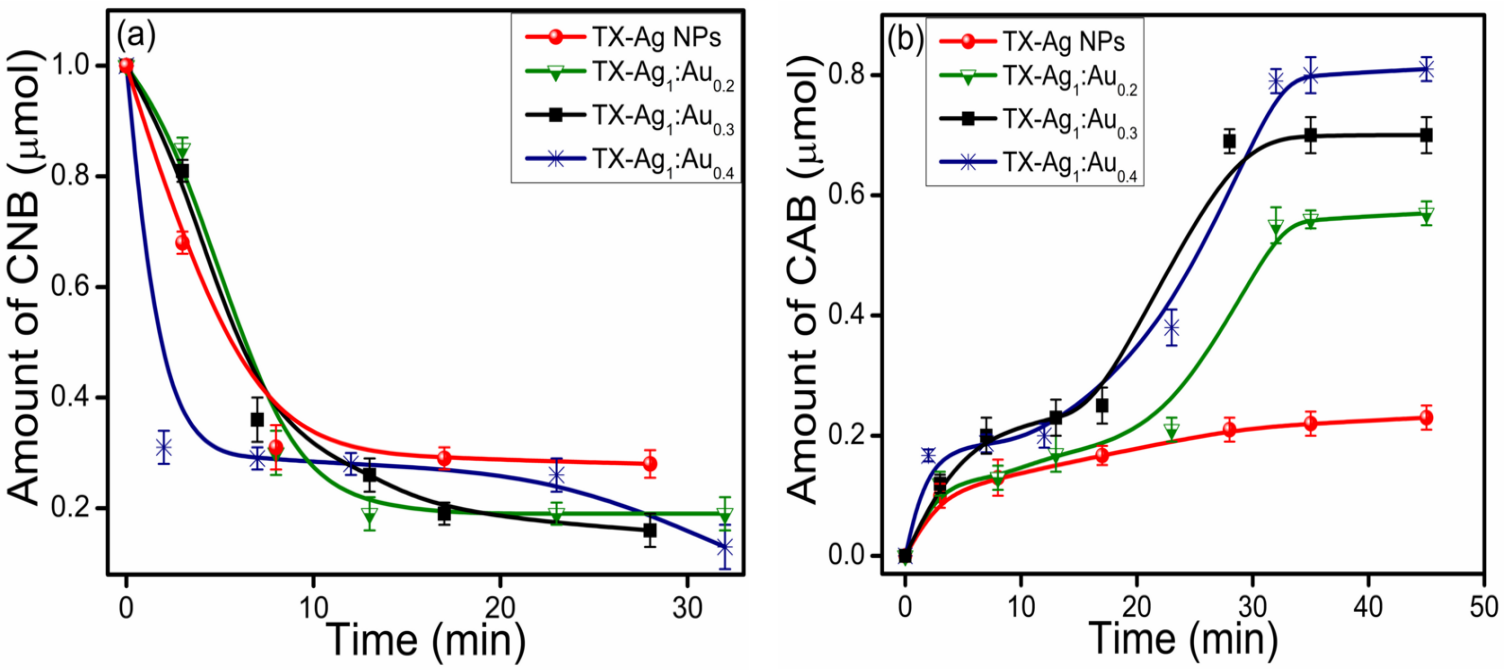

Fig. S7. Time course graph showing catalytic activity for the reduction of 2-chloro-3-nitrobenzene to 2-chloro-3-aminobenzene by (a-b) TX-Ag nanoparticles, and their Ag-Au bimetallic nanostructures.

Reproducibility test:

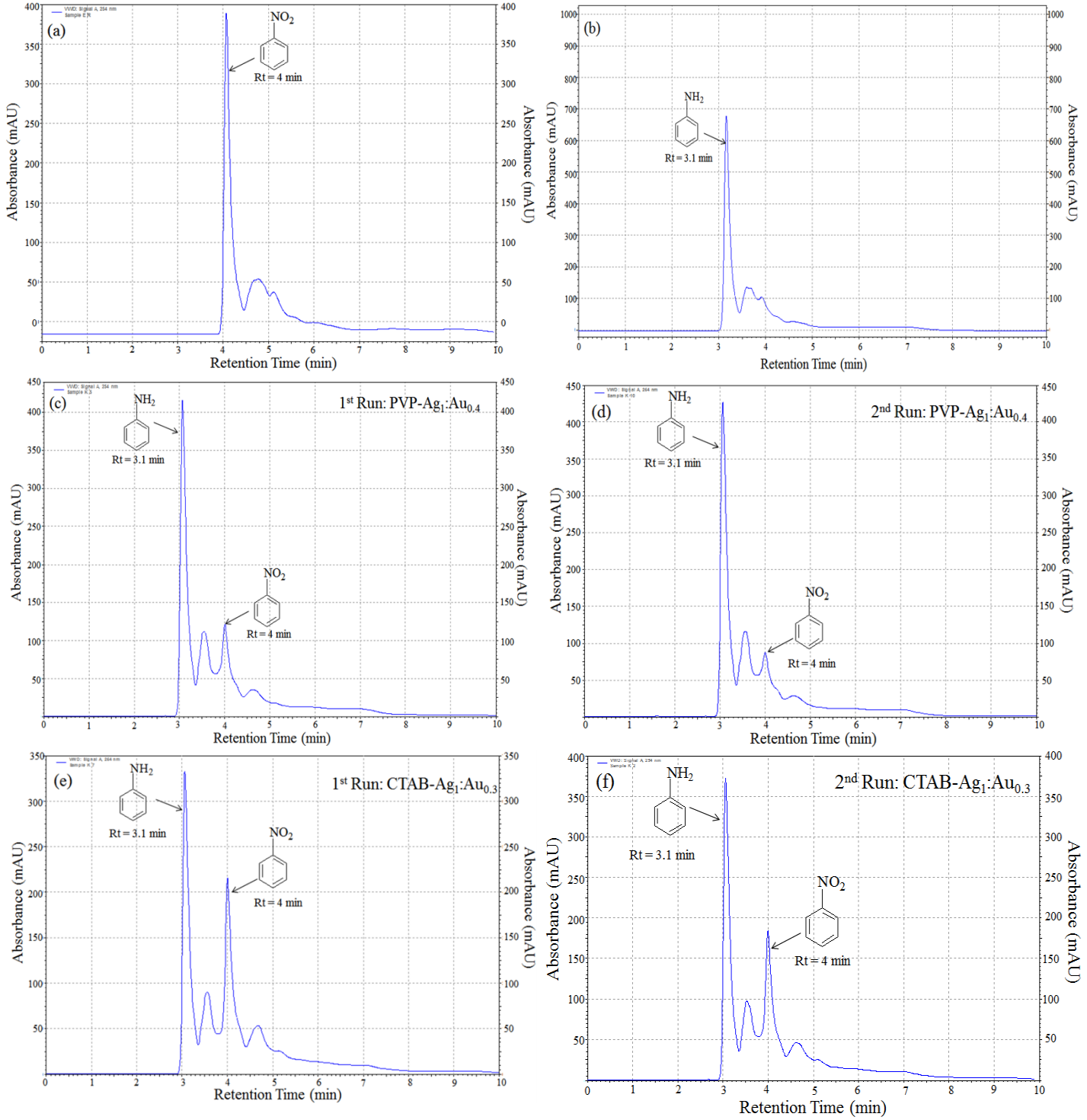

Fig. S8. HPLC chromatogram of (a) authentic 0.2 mM nitrobenzene, (b) authentic 0.2 mM aniline, and reaction product obtained after 45-50 min reduction of nitrobenzene (0.2 mM) to aniline by (a-b) PVP-Ag_1:$Au_{0.4}$, and (c-d) CTAB-Ag_1:$Au_{0.3}$.

Section S9. Calculations for quantification of Aniline produced after analyzed by HPLC (as shown above) as follows:

5 mL of 0.2 mM nitrobenzene (NB) contains 1 µmol, peak height is 400 mAU (**Fig. S8a, ESI)**

5 mL of 0.2 mM aniline (AN) contains1 µmol, peak height is 630 mAU (**Fig. S8b, ESI)**

(A) After catalytic reduction by PVP-Ag_1:$Au_{0.4}$, AN peak height is 420 mAU (**Fig. S8c, ESI)**

Therefore, Amount of AN produced = $\frac{1\ \mu mol \times 420\ mAU}{630\ mAU} = 0.66\ \mu mol.$

On repeating, the reaction by PVP-Ag_1:$Au_{0.4}$, AN peak height is 430 mAU (**Fig. S8d, ESI)**

Amount of AN produced = $\frac{1\ \mu mol \times 430\ mAU}{630\ mAU} = 0.68\ \mu mol.$

(B) Similarly, the catalytic reduction by CTAB-Ag_1:$Au_{0.3}$ yielded 0.54 µmol of AN in 1st run (**Fig. S8e, ESI**) and 0.57 µmol of AN in 2nd run (**Fig. S8f, ESI)**

Thus, obtained results confirm the reproducibility of AN formation during NB catalytic reduction. In the similar way, the reproducibility tests were carried out for other catalytic reactions and the necessary error bars are inserted in Fig. 10, 11 (main manuscript) and Fig. S7 (ESI).