

## Supplementary Information

### Facile assemble of 2D $\alpha$ -zirconium phosphate supported silver nanoparticles: superior and recyclable catalysis

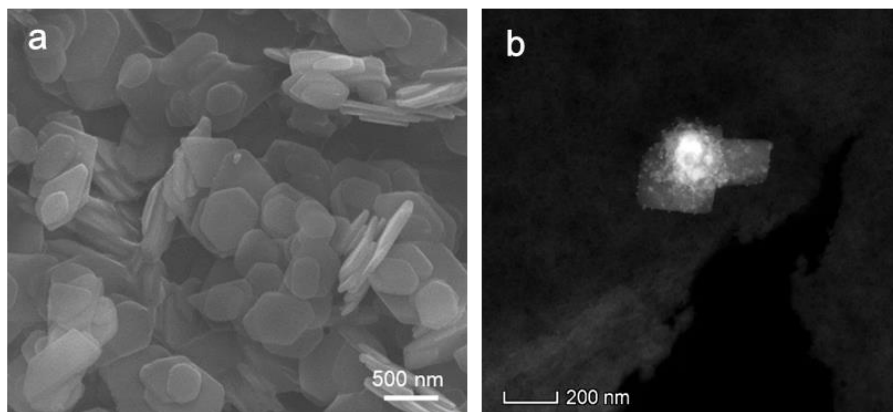
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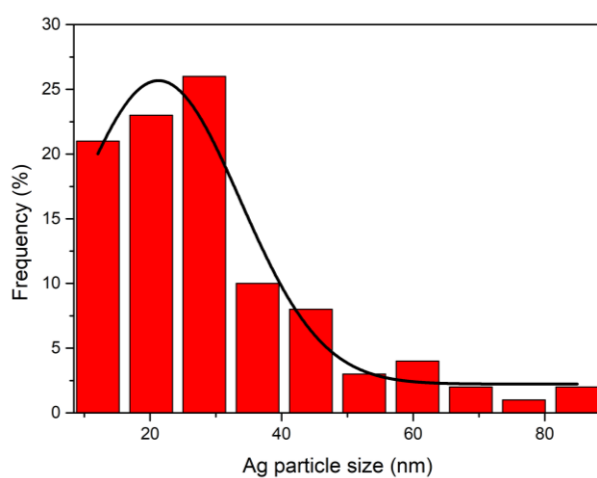
<sup>b</sup> *School of Materials Science and Engineering, Sun Yat-sen University, Guangzhou 510275, Guangdong, China*

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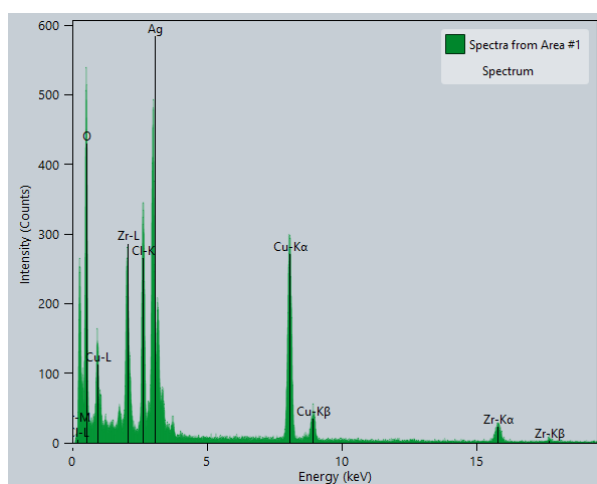
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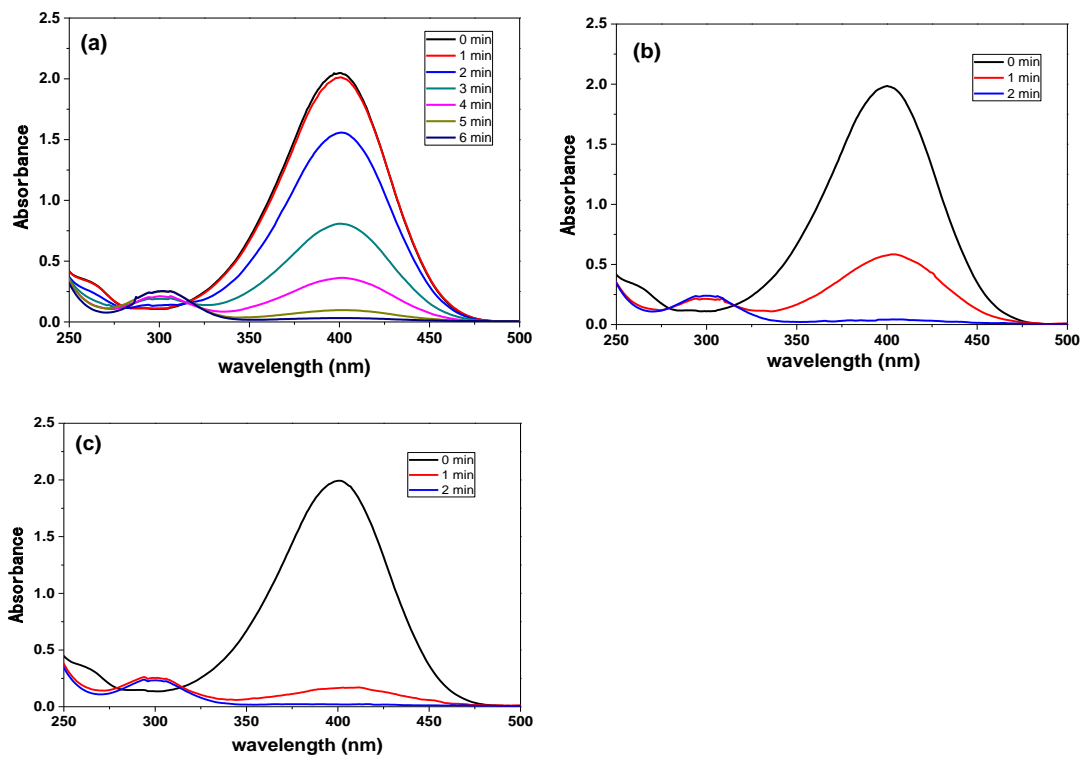
**Fig. S1.** (a) SEM image of ZrP microcrystals and (b) STEM image of ZrP@PDA/Ag



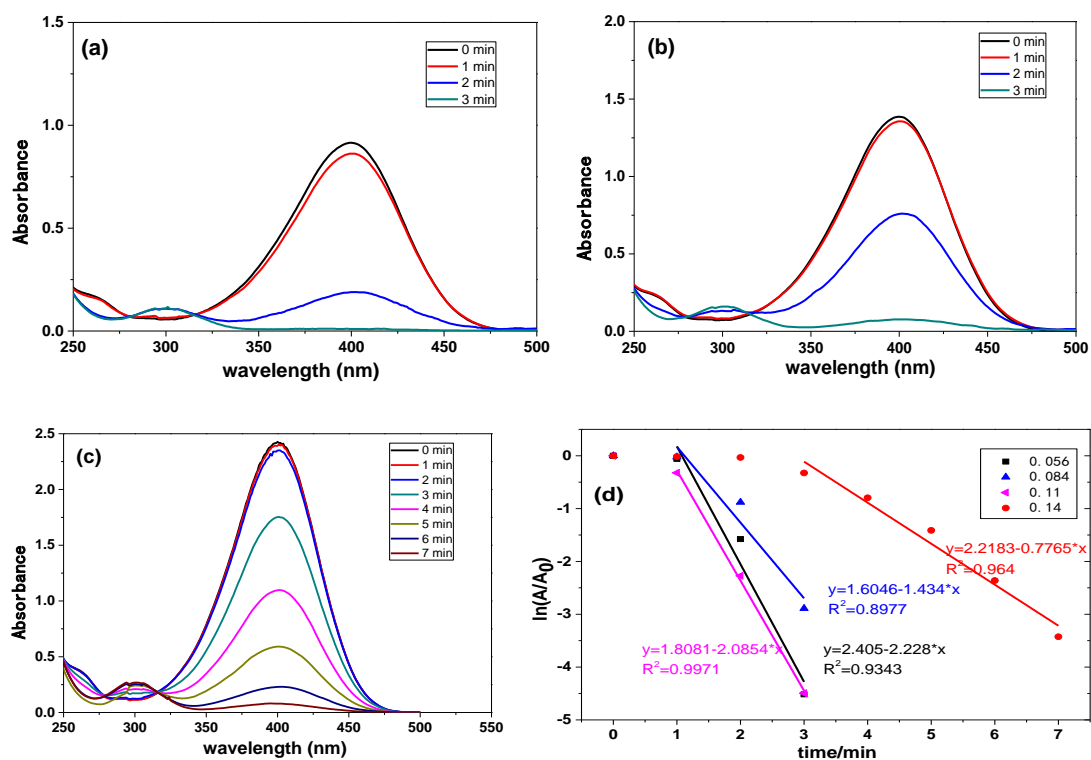
**Fig. S2.** Size distribution of AgNPs in the chosen area of Fig. 2b



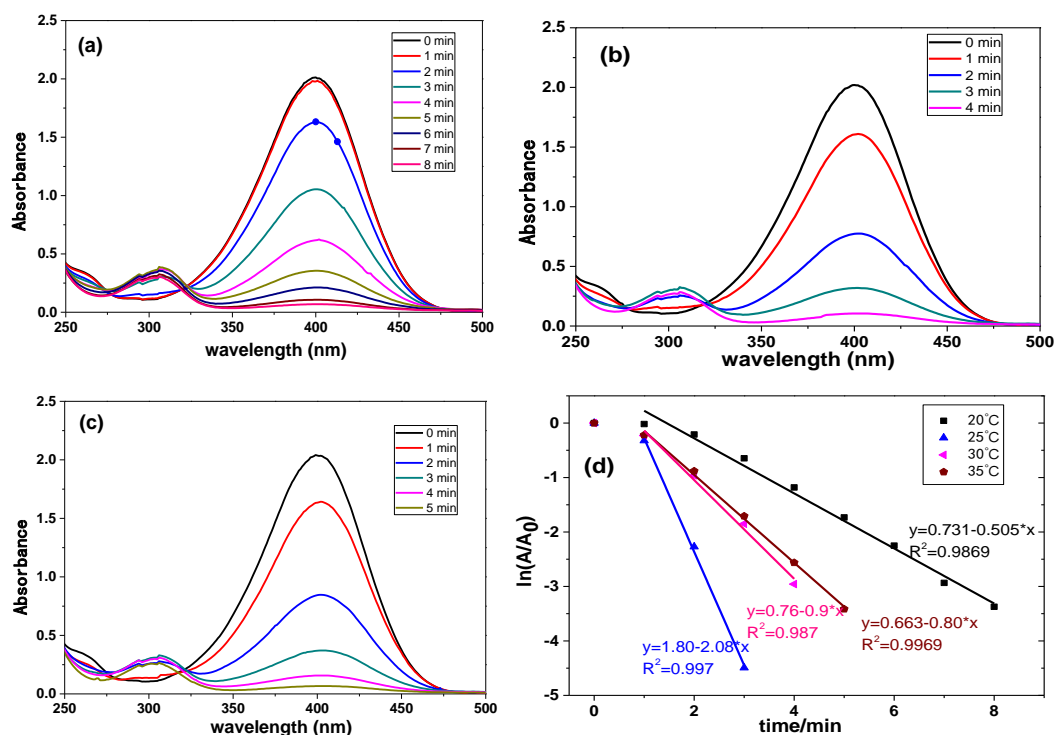
**Fig. S3.** Corresponding EDS spectrum of the HAADF image in Fig. 3d



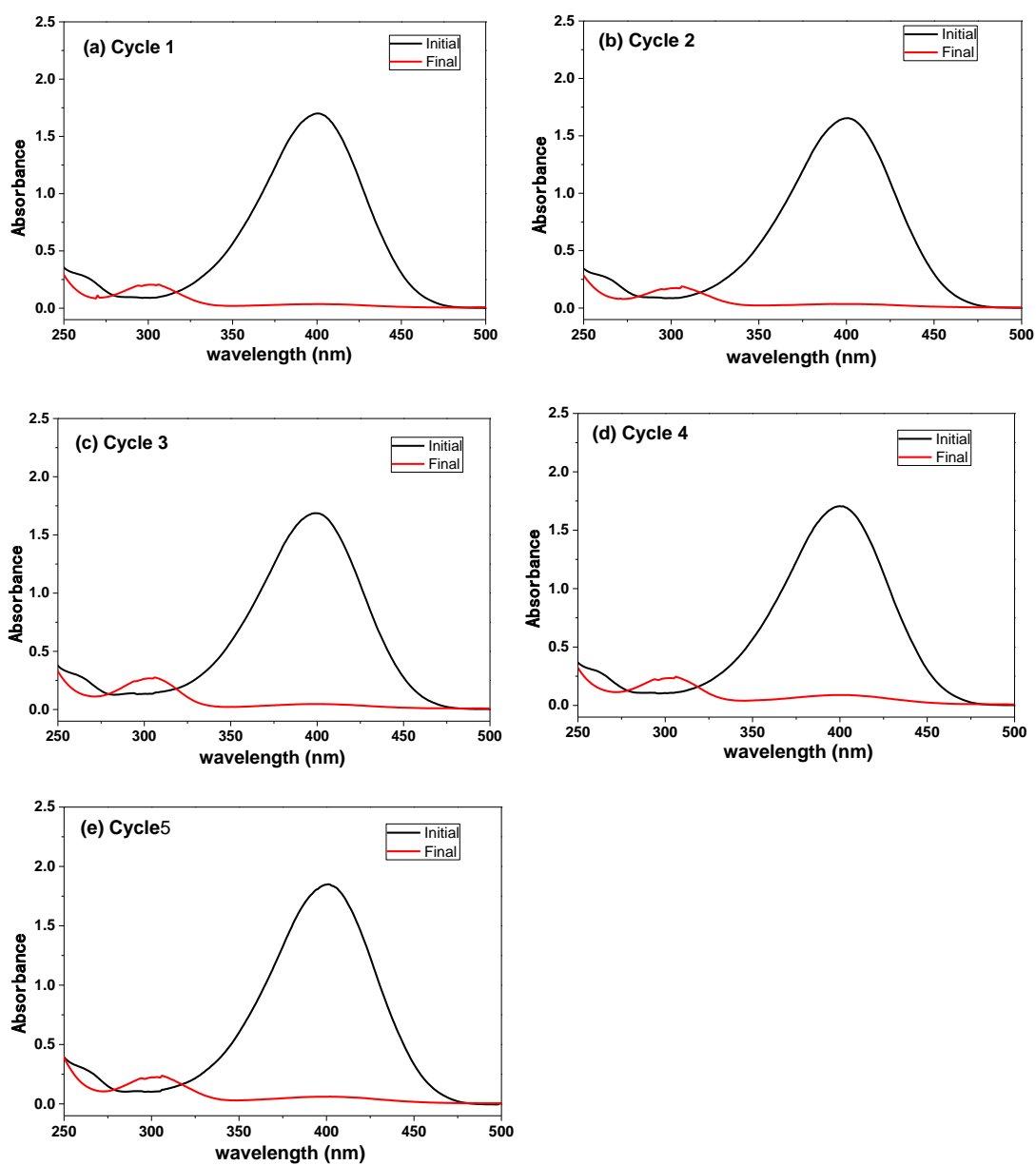
**Fig. S4.** UV-vis absorption spectra of the reduction of 4-NP to 4-AP with different concentrations of ZrP@PDA/Ag of (a) 0.0625  $\mu\text{g/mL}$ , (b) 0.1875  $\mu\text{g/mL}$  and (c) 0.25  $\mu\text{g/mL}$ . Conditions: 3 mL of 0.24 mM 4-NP, 3 mL of 76 mM  $\text{NaBH}_4$  and defined amount of Dispersion 2 were mixed, and 3 mL of the mixture was introduced into the cuvette.



**Fig. S5.** UV-vis absorption spectra of the reduction of 4-NP to 4-AP with different initial contents of 4-NP of (a) 0.056 mM, (b) 0.084 μg/mL and (c) 0.14 μg/mL. (d) Plots of  $\ln(A_t/A_0)$  vs time with different 4-NP contents in the reaction solution. Conditions: 3 mL of aqueous 4-NP with given concentrations, 3 mL of 76 mM NaBH<sub>4</sub> and 400 μL of Dispersion 2 were mixed, and 3 mL of the mixture was introduced into the cuvette.



**Fig. S6.** UV-vis absorption spectra of the reduction of 4-NP to 4-AP at different reaction temperatures of (a) 20 °C, (b) 30 °C and (c) 35 °C. (d) Plots of  $\ln(A_t/A_0)$  vs time at different reaction temperatures. Conditions: 3 mL of 0.24 mM 4-NP, 3 mL of 76 mM  $\text{NaBH}_4$  and 400  $\mu\text{L}$  of Dispersion 2 were mixed, and 3 mL of the mixture was introduced into the cuvette.



**Fig. S7.** UV-vis absorption spectra of the reduction of 4-NP in the recyclability experiments.