

Electronic Supplementary Information

PNIPAM-immobilized Gold-nanoparticles with Colorimetric Temperature-sensor and Reusable Temperature-switchable Catalysis Properties

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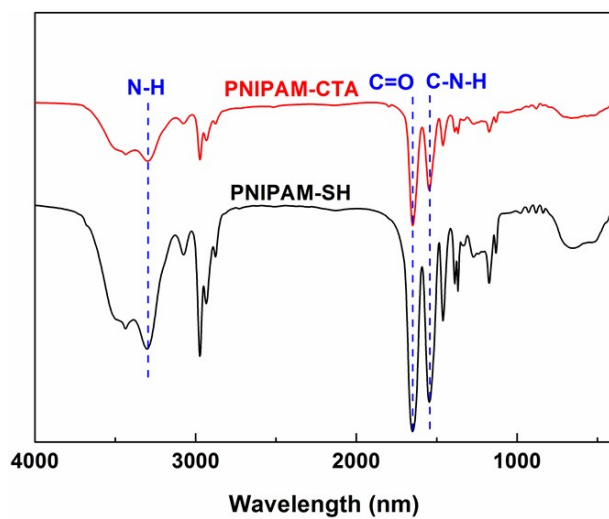


Fig. S1 FTIR spectra of PNIPAM₆₁₀₀-CTA and PNIPAM₆₉₀₀-SH.

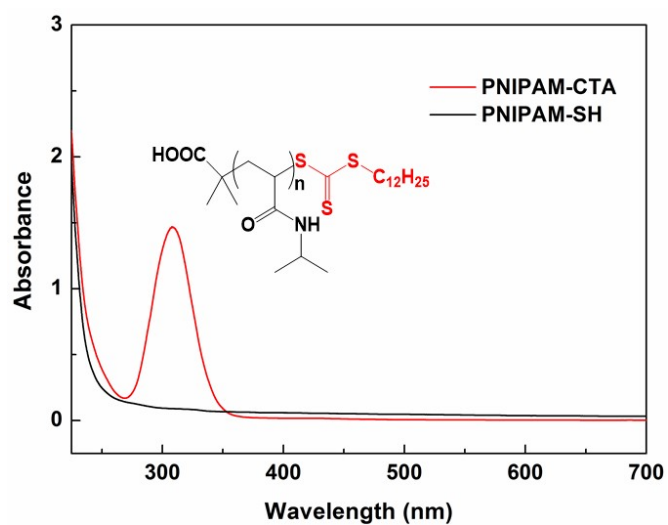


Fig. S2 UV-vis absorption spectra of PNIPAM₆₁₀₀-CTA and PNIPAM₆₉₀₀-SH.

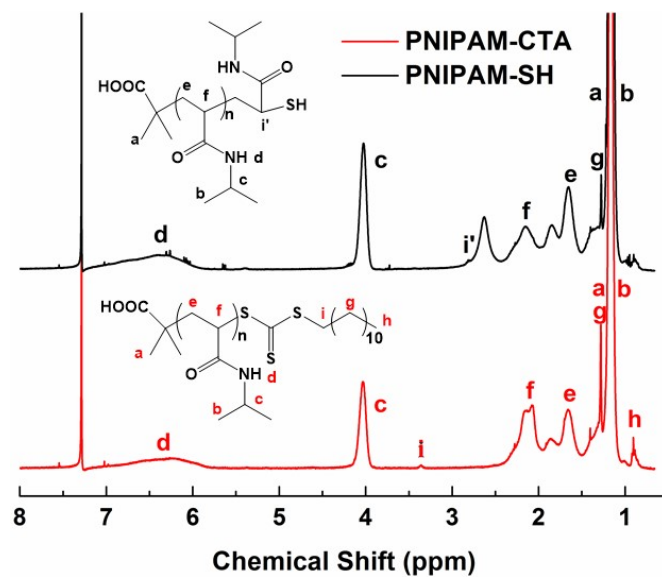


Fig. S3 ¹H-NMR spectra of PNIPAM₆₁₀₀-CTA and PNIPAM₆₉₀₀-SH.

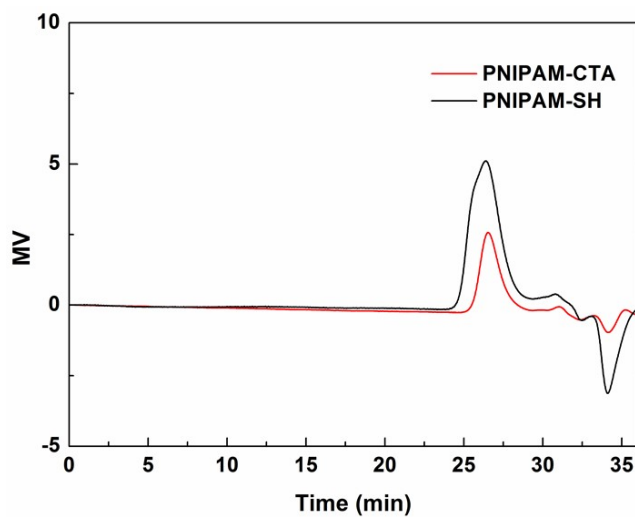


Fig. S4 GPC curves of PNIPAM₆₁₀₀-CTA and PNIPAM₆₉₀₀-SH.

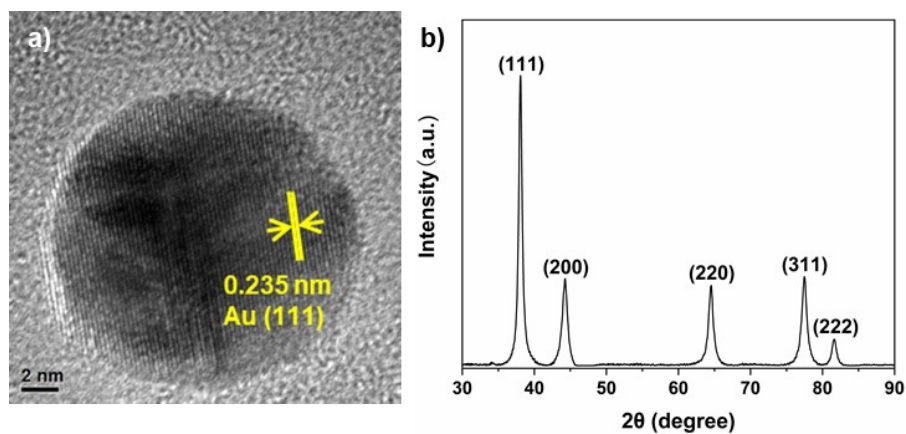


Fig. S5 The crystal structure of AuNPs obtained by TEM and XRD.

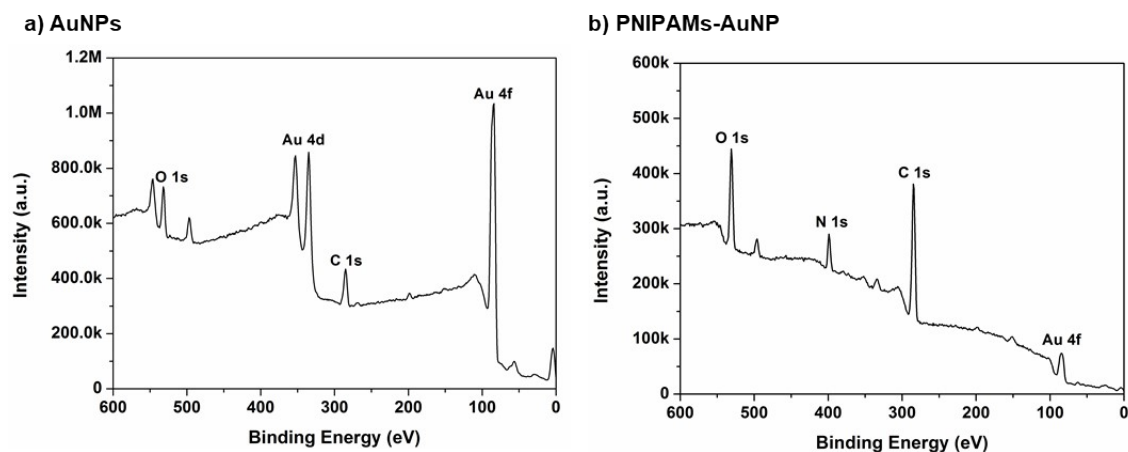


Fig. S6 The elemental analysis of AuNPs and PNIPAMs₆₉₀₀-AuNP by XPS.

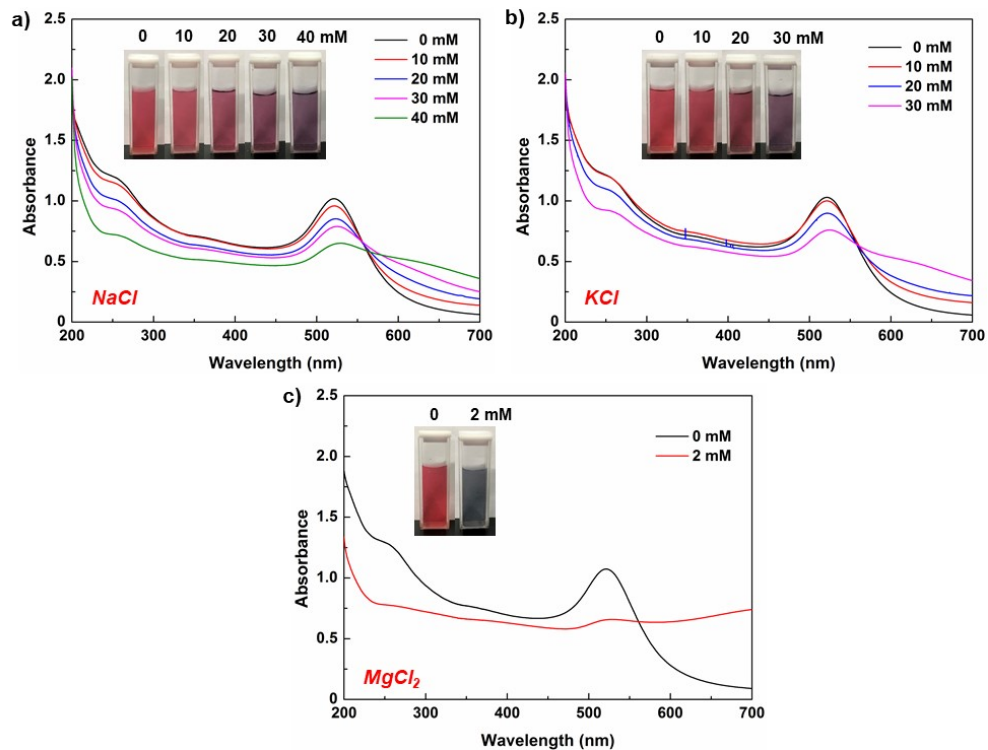


Fig. S7 UV-vis absorbance spectra of AuNPs aqueous dispersion for different salt types and concentrations at 25 °C: a) NaCl; b) KCl; c) MgCl₂. The insets show the irreversible color changes with salt concentrations.

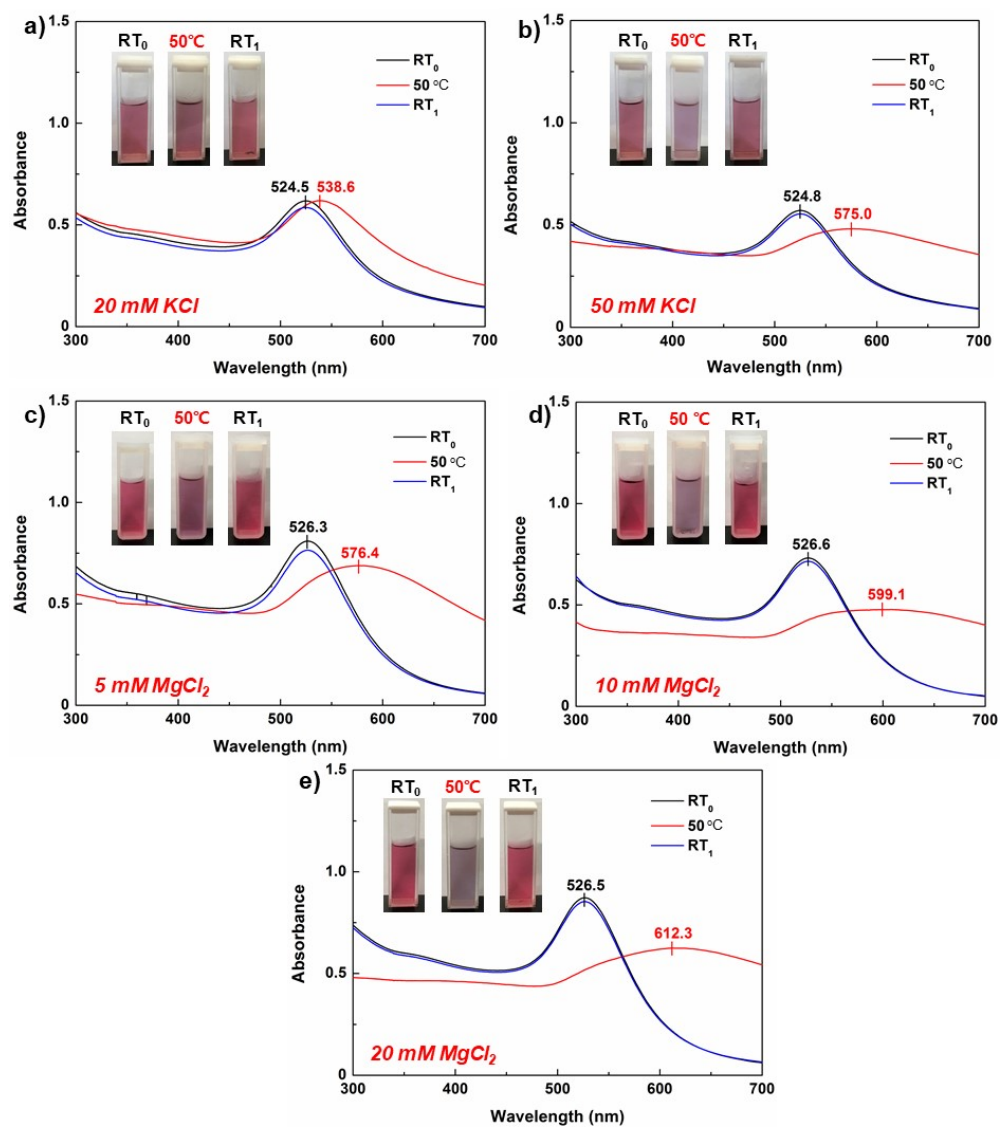


Fig. S8 UV-vis absorbance spectra of PNIPAMs₆₉₀₀-AuNP aqueous dispersion with a) 20 mM and b) 50 mM of KCl; c) 5 mM, d) 10 mM and e) 20 mM of MgCl₂ from 25 °C to 50 °C. The insets show the reversible color change from 25 °C to 50 °C. RT₀ represents the initial dispersion at 25 °C, RT₁ represents the dispersion after cooling from 50 °C to 25 °C.

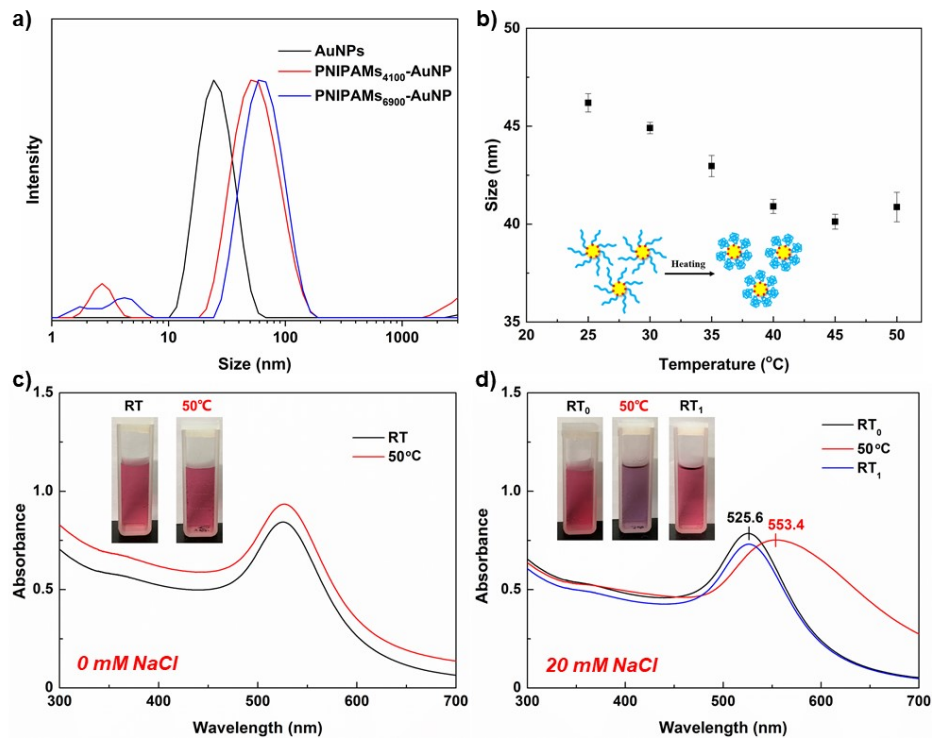


Fig. S9 a) The size distributions of AuNPs and PNIPAMs-AuNP obtained via DLS measured at 25 °C. b) The hydrodynamic size of PNIPAMs₄₁₀₀-AuNP hybrid nanoparticles at different temperatures measured by DLS. c) UV-vis absorbance spectra of PNIPAMs₄₁₀₀-AuNP dispersion without NaCl from 25 °C to 50 °C. d) UV-vis absorbance spectra of PNIPAMs₄₁₀₀-AuNP dispersion with 20 mM NaCl from 25 °C to 50 °C. The inset shows the dispersion's color change with temperature.

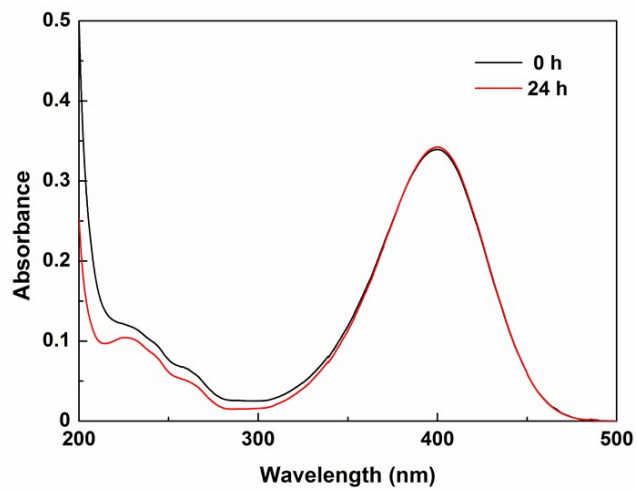


Fig. S10 UV-vis absorption spectra of reduction of 4-NP without PNIPAMs-AuNP catalyst.

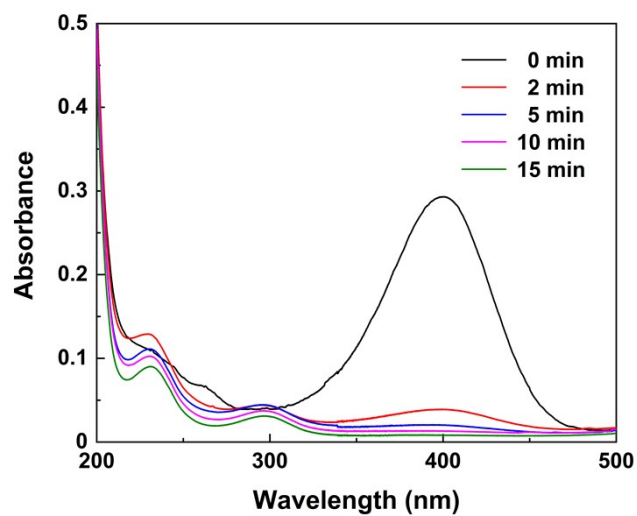


Fig. S11 UV-vis absorption spectra of 4-NP reduction catalyzed by AuNPs at 25 °C.