

Synthesis, stabilization, growth behavior, and catalytic activity of highly concentrated silver nanoparticles using a multifunctional polymer in an aqueous-phase

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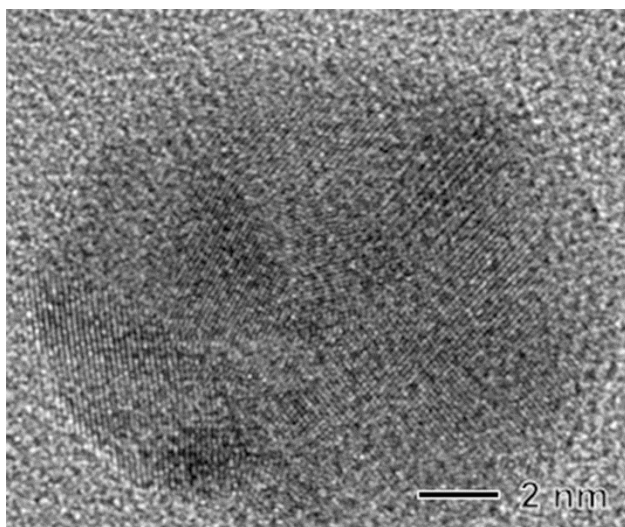


Fig. S1. HRTEM image of the Ag nanoparticles shown in Fig. 1(b).

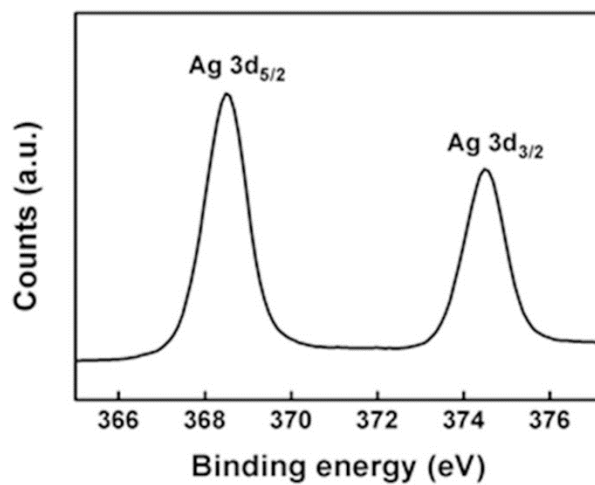


Fig. S2. XPS spectra of the Ag nanoparticles shown in Fig. 1.

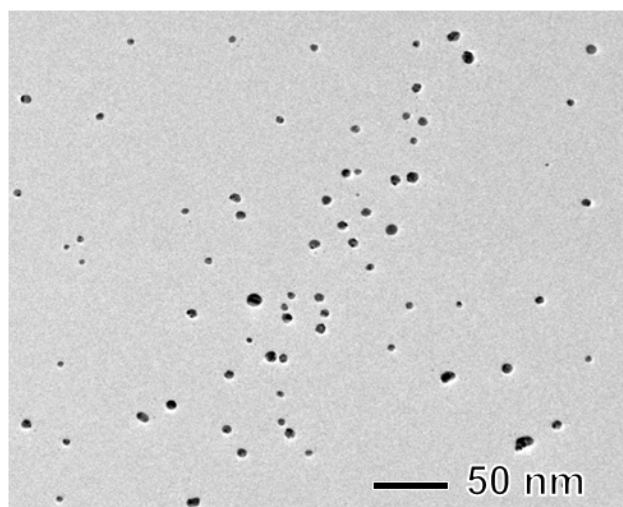


Fig. S3. TEM image of the Ag nanoparticles prepared under the same conditions as those in Fig. 1, except that the sample was stored for 40 days.

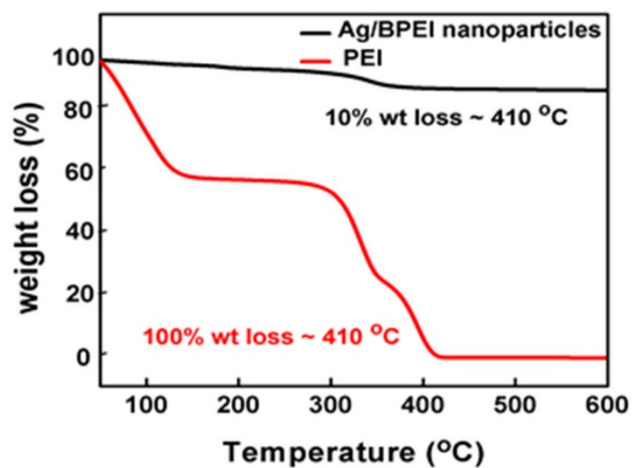


Fig. S4. TGA thermogram of BPEI and the BPEI-stabilized Ag nanoparticles shown in Fig. 1.

Percentage yield calculation:

wt of Ag nanoparticles = 0.1201 g

wt of Ag used for reaction = 0.1284 g

From TG data mass of Ag nanoparticles (~90%) = $0.1201 \times 0.90 = 0.1089$ g

% yield of Ag nanoparticles = $0.1089 \times (100/0.1284) = 84.2\%$

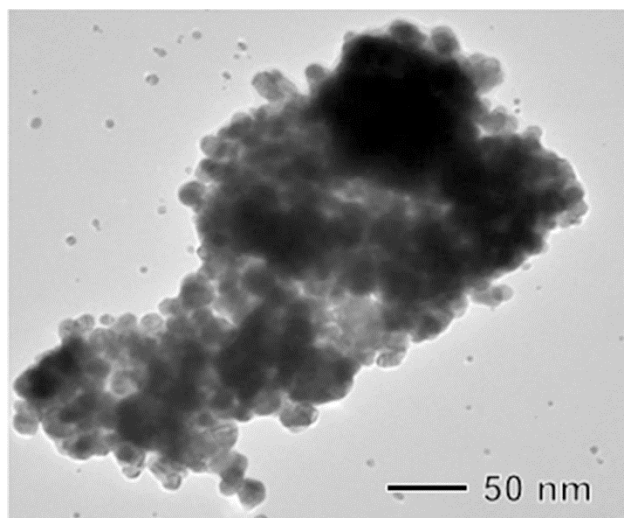


Fig. S5. TEM image of sample prepared under the same conditions as those in Fig. 1, except that synthesis was conducted using an ethyleneimine oligomer instead of BPEI.

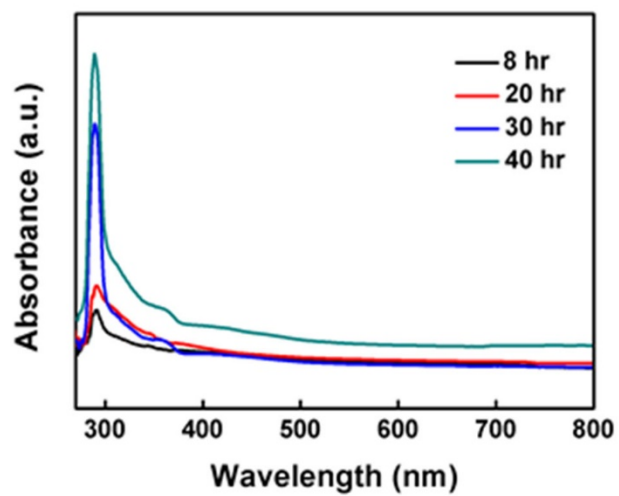


Fig. S6. UV-vis spectra of sample prepared under the same conditions as those in Fig. 1, except that synthesis was conducted at a high BPEI/AgNO₃ weight ratio of 55.

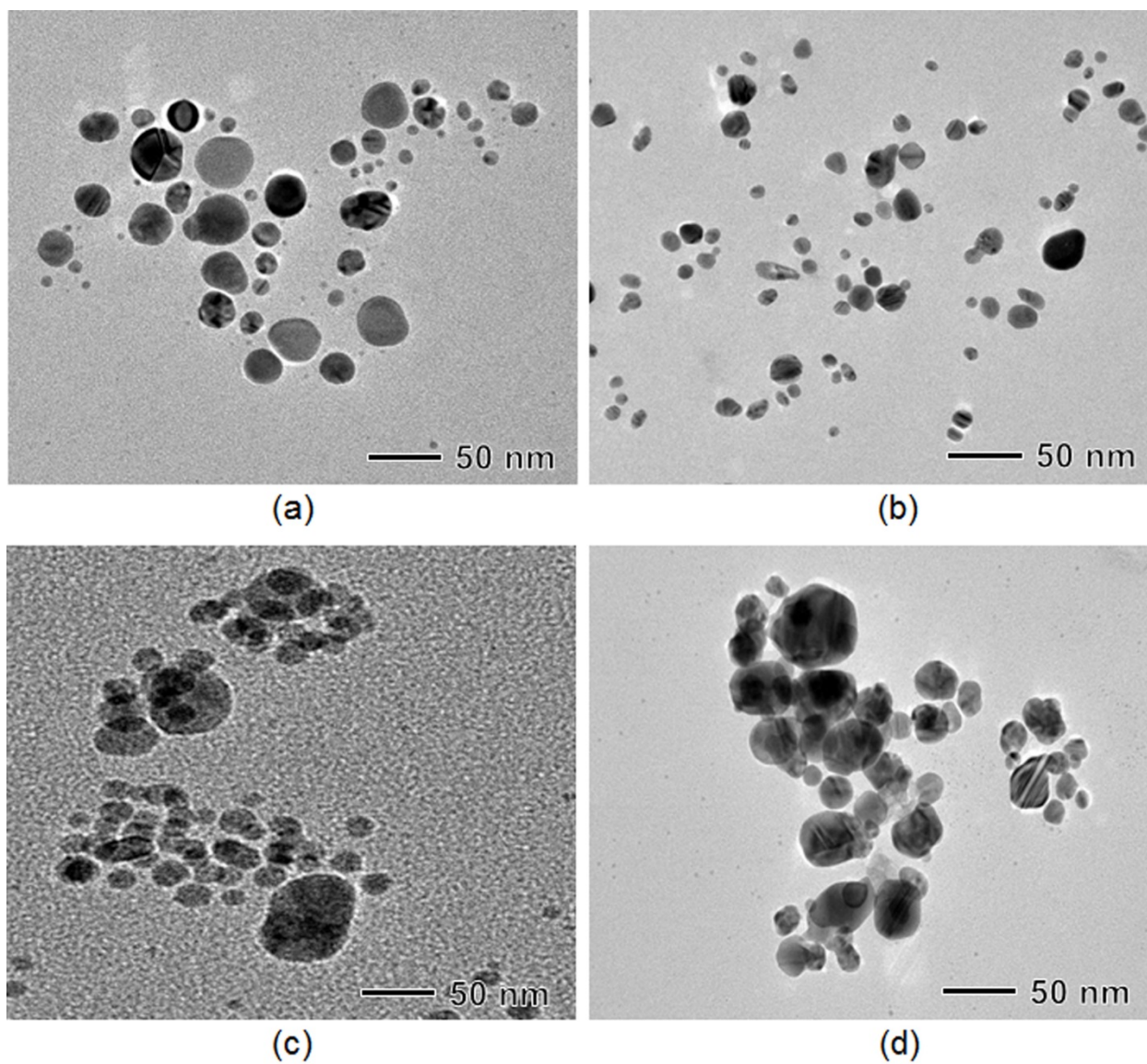


Fig. S7. TEM images of Ag nanoparticles prepared under the same conditions as those in Fig. 1, except that synthesis was conducted in the presence of (a) 100times diluted BPEI and AgNO_3 , (b) BPEI having low molecular weight (MW = 25,000), (c) LPEI (MW = 25,000), and (d) PVP, respectively.

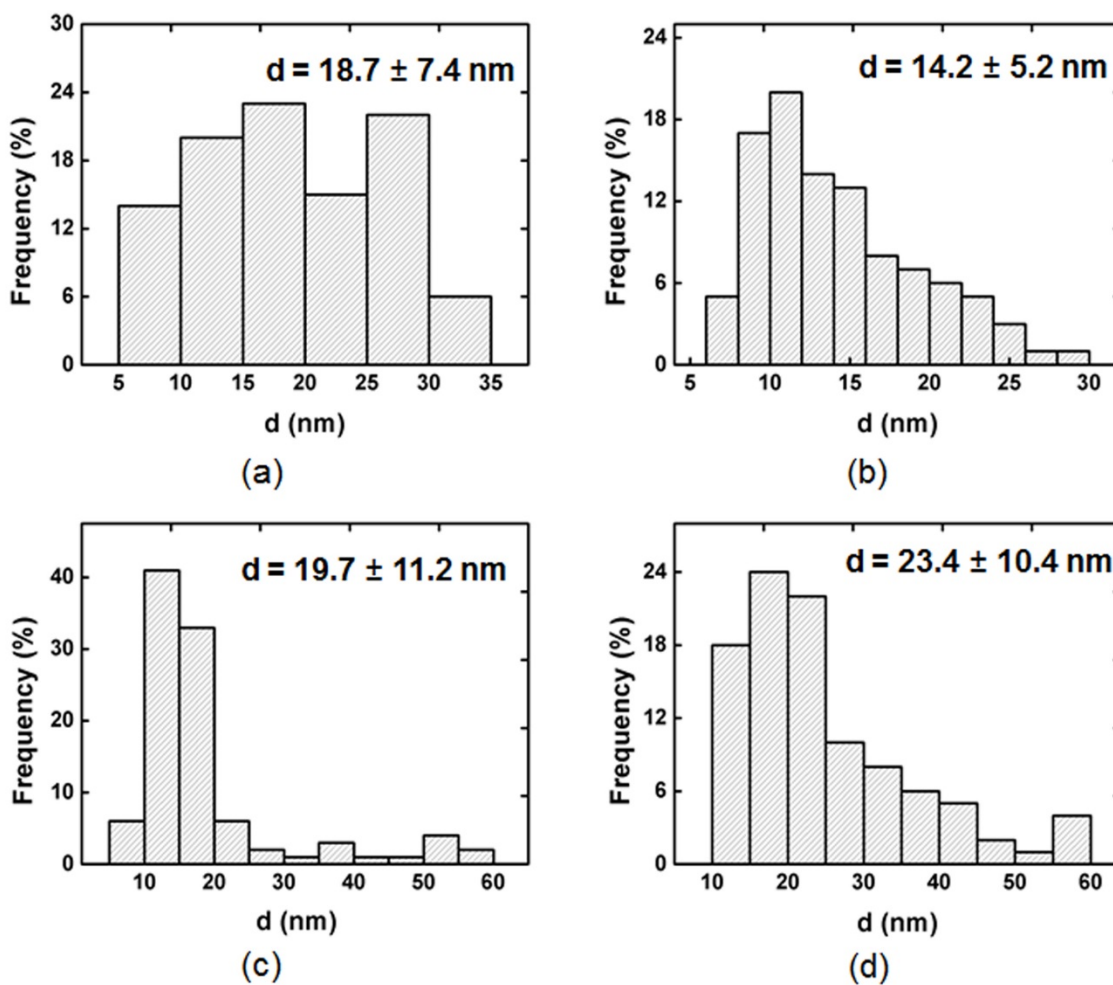


Fig. S8. Particle size distributions of Ag nanoparticles prepared under the same conditions as those in Fig. 1, except that synthesis was conducted in the presence of (a) 100 times diluted BPEI and AgNO₃, (b) BPEI having low molecular weight (MW = 25,000), (c) LPEI (MW = 25,000), and (d) PVP, respectively.

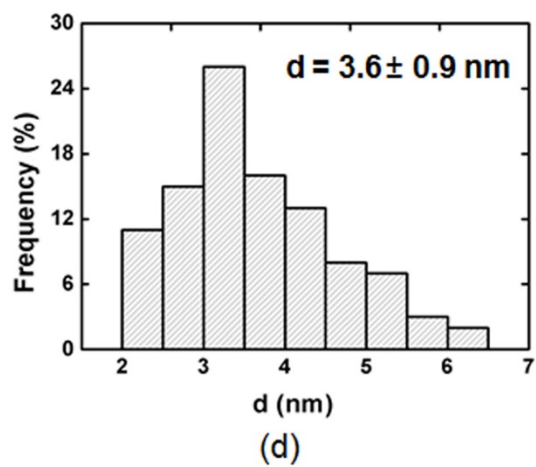
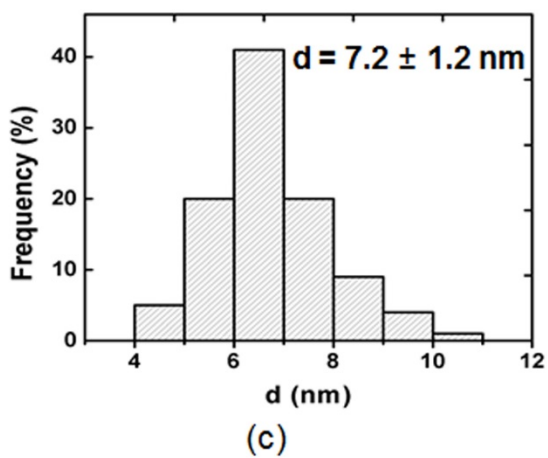
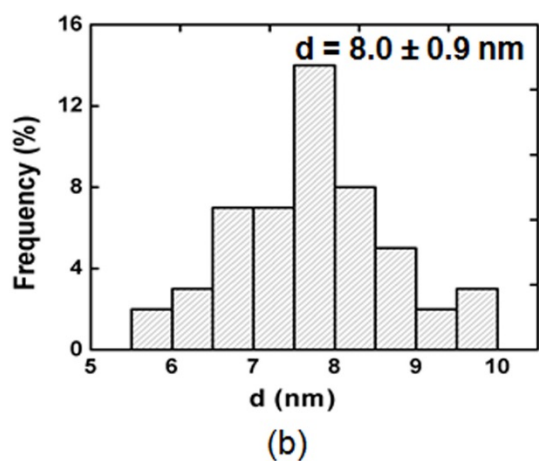
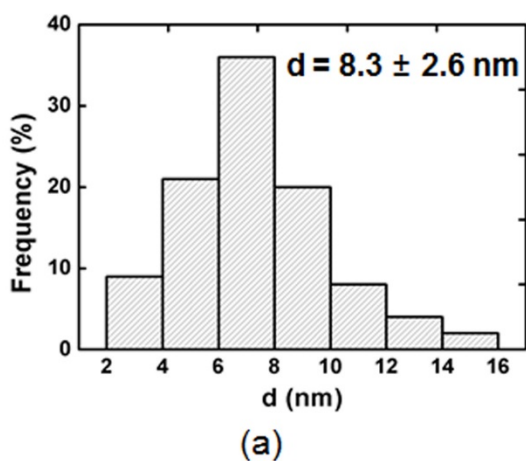


Fig. S9. Particle size distributions of Ag nanoparticles prepared under the same conditions as those in Fig. 1, except that synthesis was conducted at various reaction temperatures: (a) 30 °C, (b) 50 °C, (c) 70 °C, and (d) 90 °C, respectively.

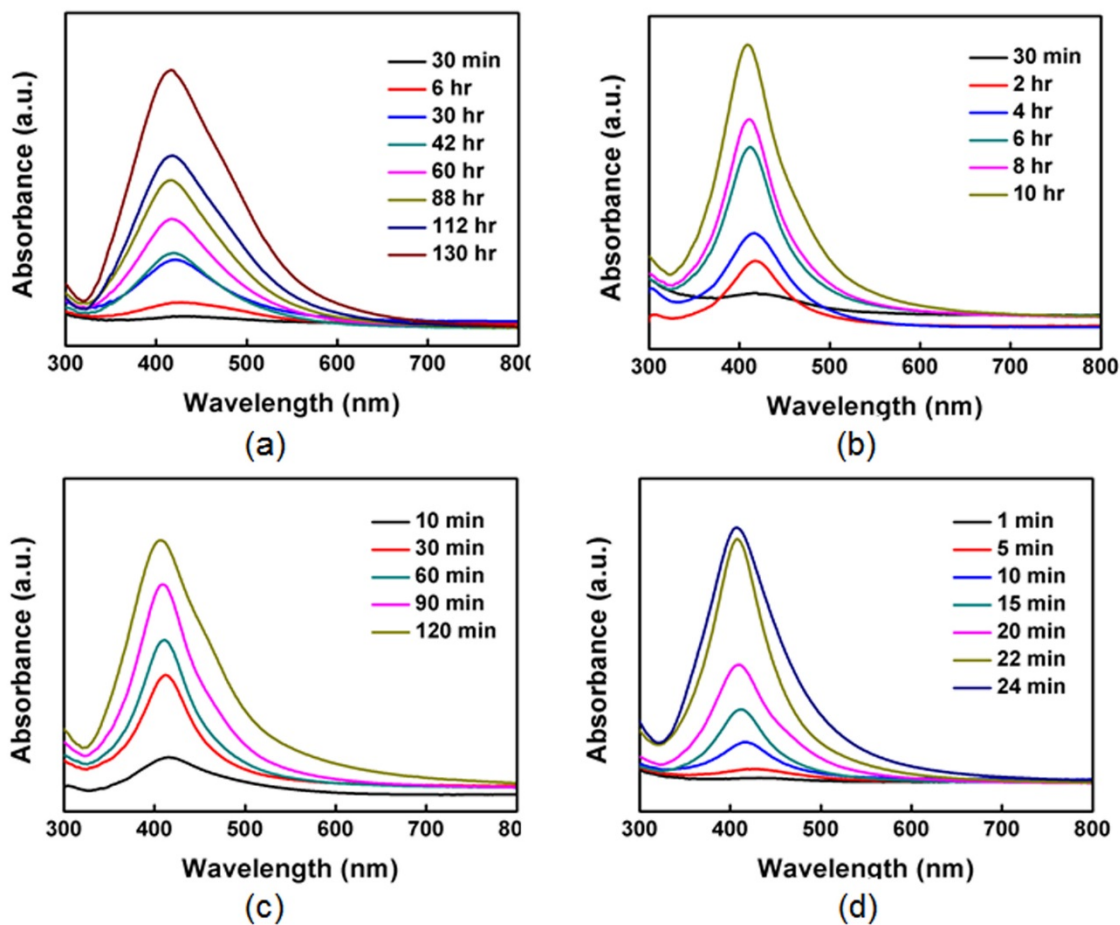


Fig. S10. UV-vis spectrum of Ag nanoparticles prepared under the same conditions as those in Fig. 1, except that synthesis was conducted at various reaction temperatures: (a) 30 °C, (b) 50 °C, (c) 70 °C, and (d) 90 °C, respectively.

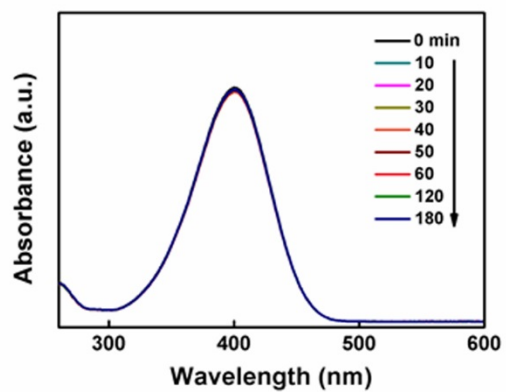


Fig. S11. UV-vis spectra of an aqueous solution containing 4-nitrophenol (5 mM) and NaBH₄ (1 M) without the addition of Ag nanoparticles.