Supporting Information for

One-pot synthesis and immobilization of gold nanoparticles using peptidyl microbeads

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Supplementary Figures

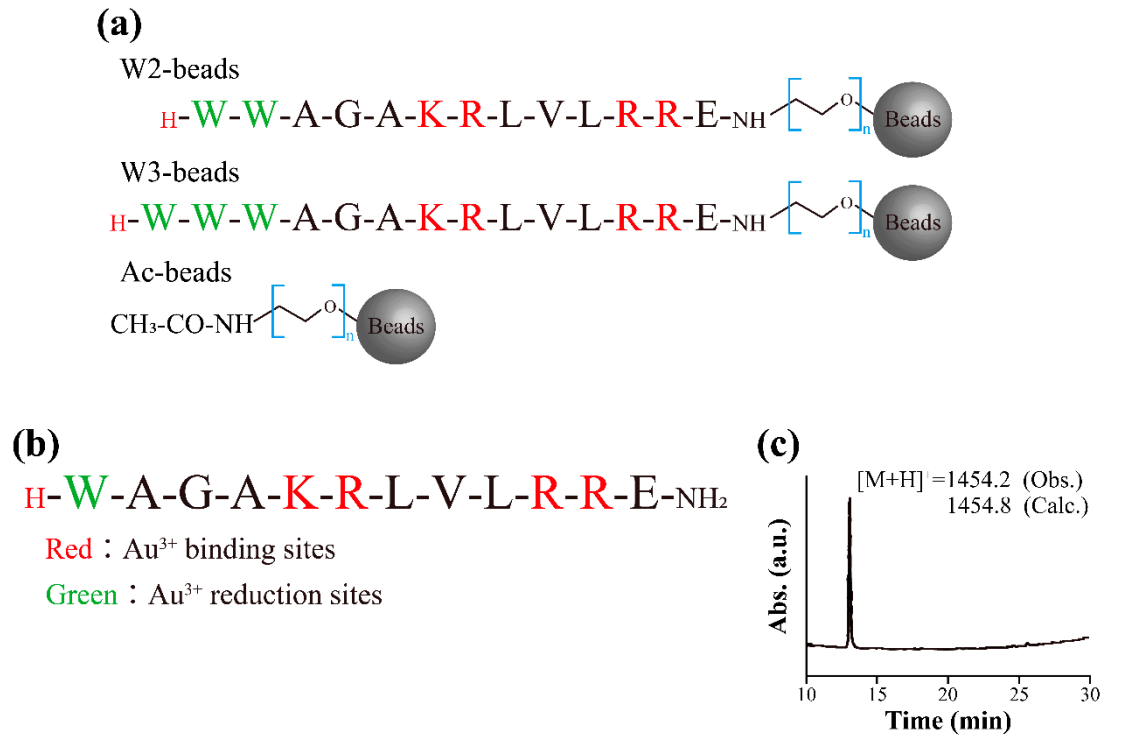


Fig. S1 (a) Design and sequence of W2-beads, W3-beads and Ac-beads. (b) Sequence of free W1. (c) HPLC chromatogram for purified W1 separated on an ODS column (150×4.6 mm, 5 μm) with MilliQ water (containing 0.1% TFA) using a gradient from 0% to 100% acetonitrile (containing 0.08% TFA) over 30 min, 1.0 mL/min; detection wavelength at 220 nm.

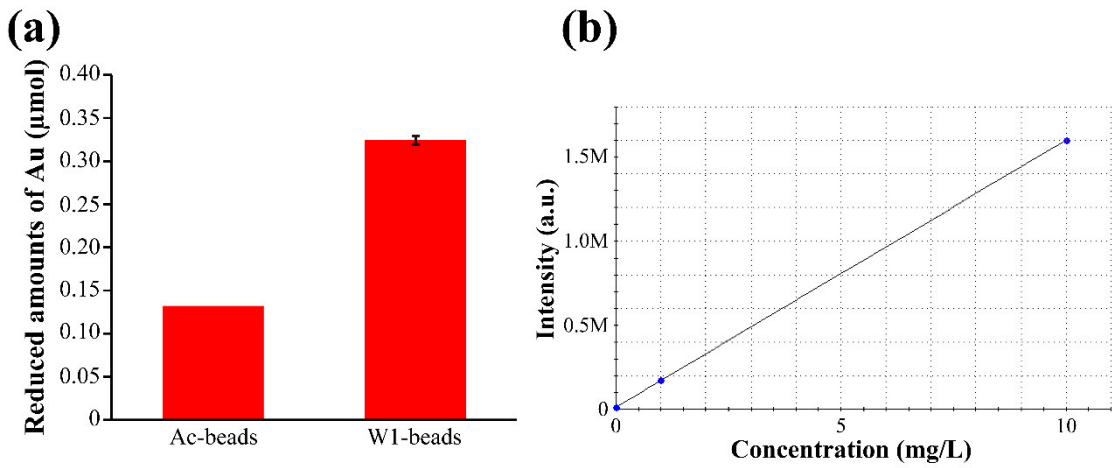


Fig. S2 (a) Quantitative analysis of Au immobilized on W1-beads or Ac-beads using ICP-AES measurement. The samples were prepared with [$HAuCl_4$] = 100 μM, [W1 (beads)] or [Ac (beads)] = 25 μM. (b) Calibration line prepared using 0, 1, and 10 ppm of Au standard solutions in ICP-AES measurements.

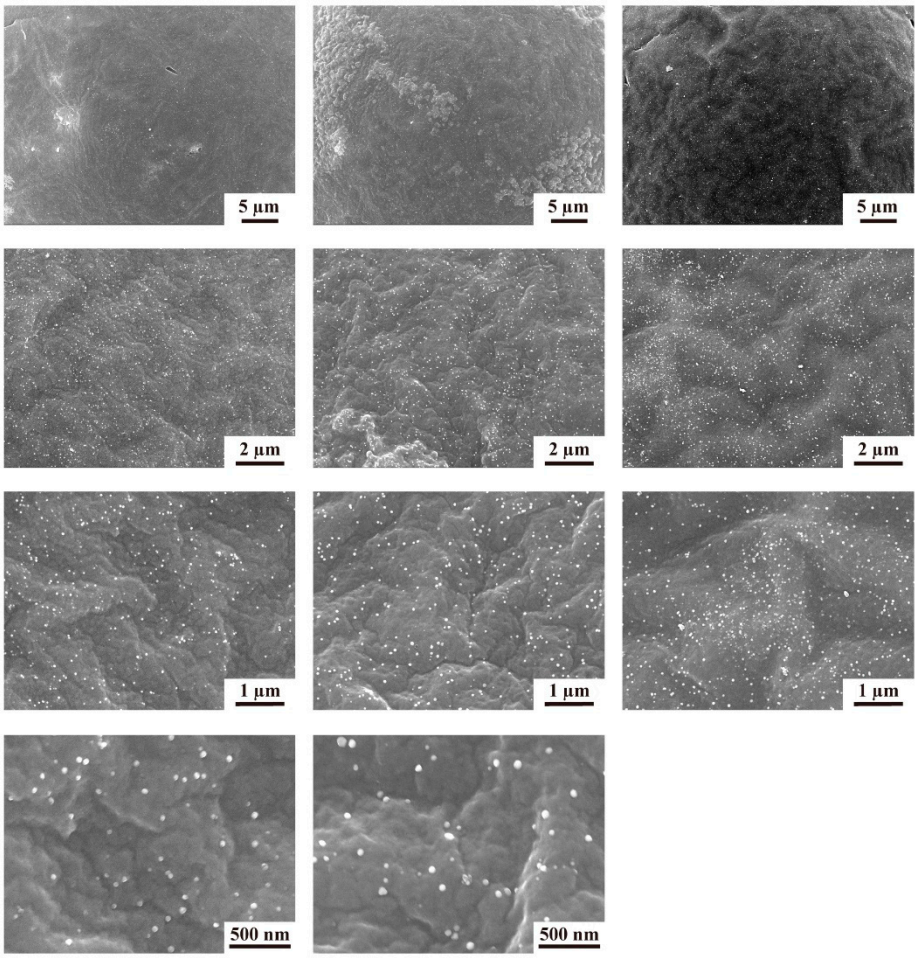


Fig. S3 SEM images with various magnification of the samples after Au reduction reaction using W1-Beads. [W1 (beads)] = 25 µM, [$HAuCl_4$] = 100 µM.

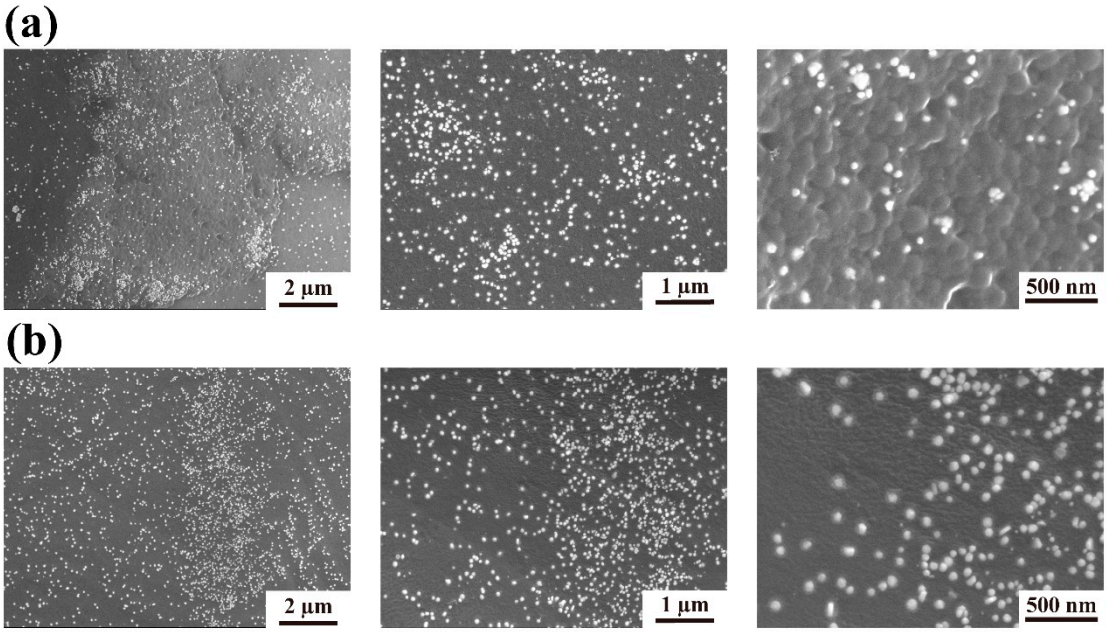


Fig. S4 SEM images of the sample after Au reduction reaction using (a) W2-beads and (b) W3-beads ([W2 (beads)] or [W3 (beads)] = 25 μM, [$HAuCl_4$] = 100 μM).

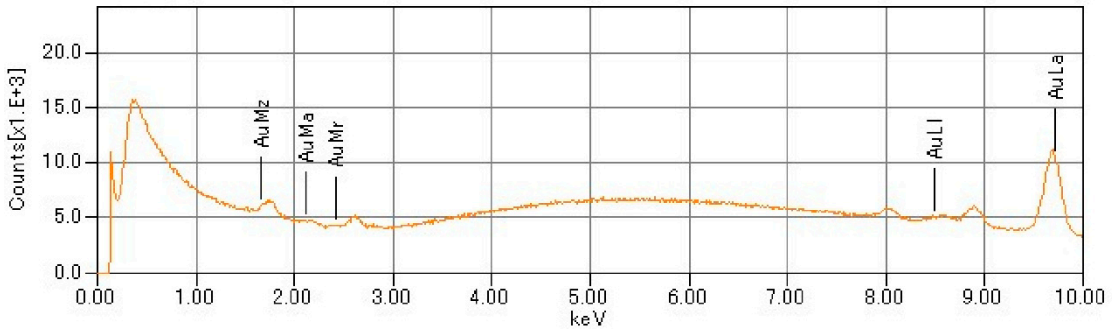


Fig. S5 EDX spectra of the sample after the Au ion reduction reaction using W1-beads. [W1 (beads)] = 25 μM, [$HAuCl_4$] = 100 μM.

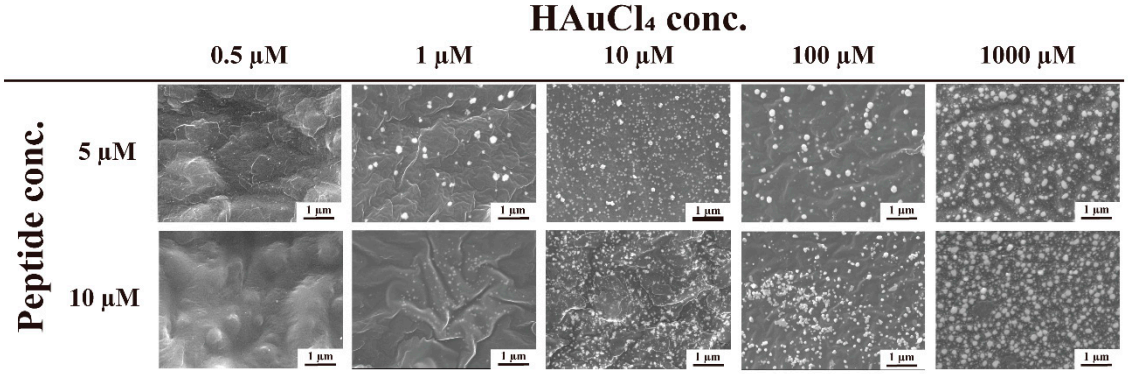


Fig. S6 SEM images of the sample after the Au ion reduction reaction using 5 or 10 μM scale of W1-beads and 0.5–1000 μM of $HAuCl_4$.

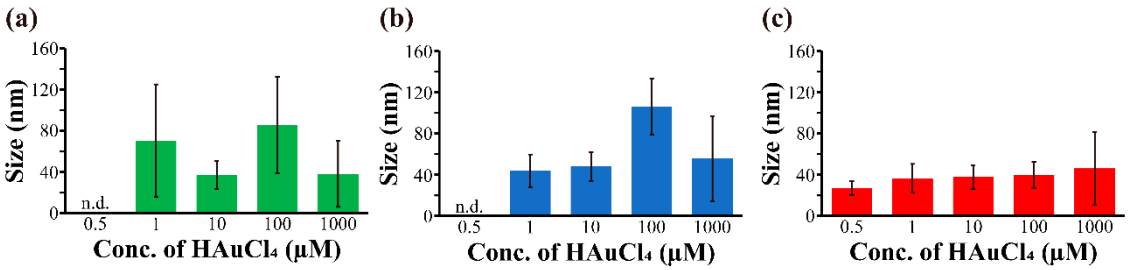


Fig. S7 (a-c) Particle size of immobilized AuNPs obtained from SEM images (N=100). (a, 5 µM W1; b, 10 µM W1; c, 25 µM W1)

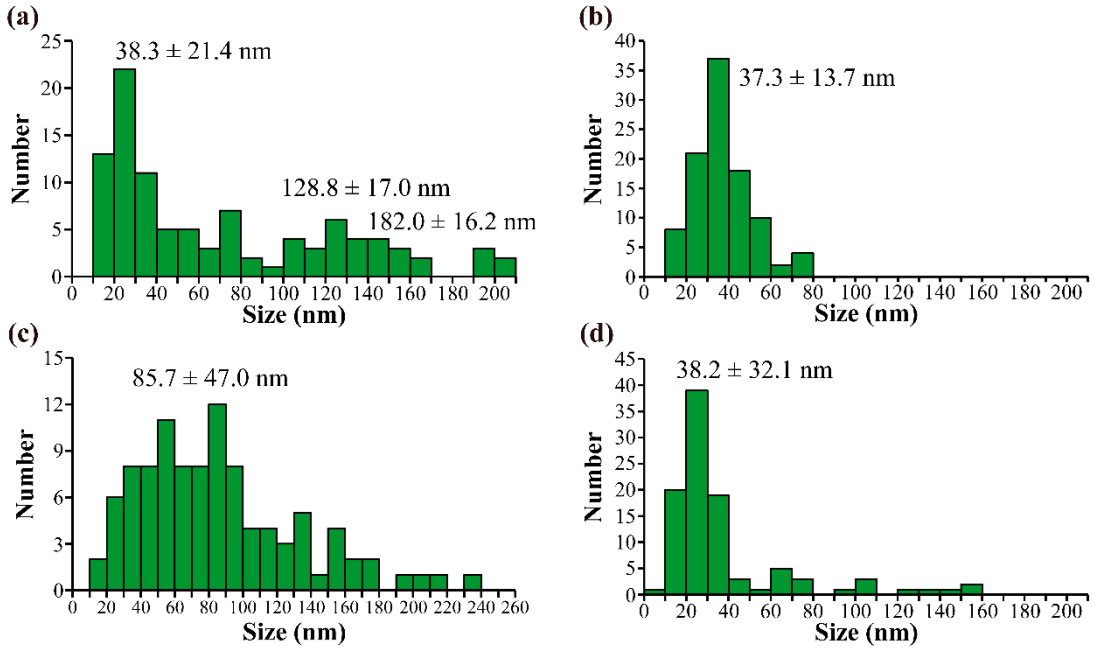


Fig. S8 Particle size histograms of the samples after gold reduction by using [W1 (beads)] = 5 μM with [$HAuCl_4$] = (a) 1 μM, (b) 10 μM, (c) 100 μM and (d) 1000 μM.

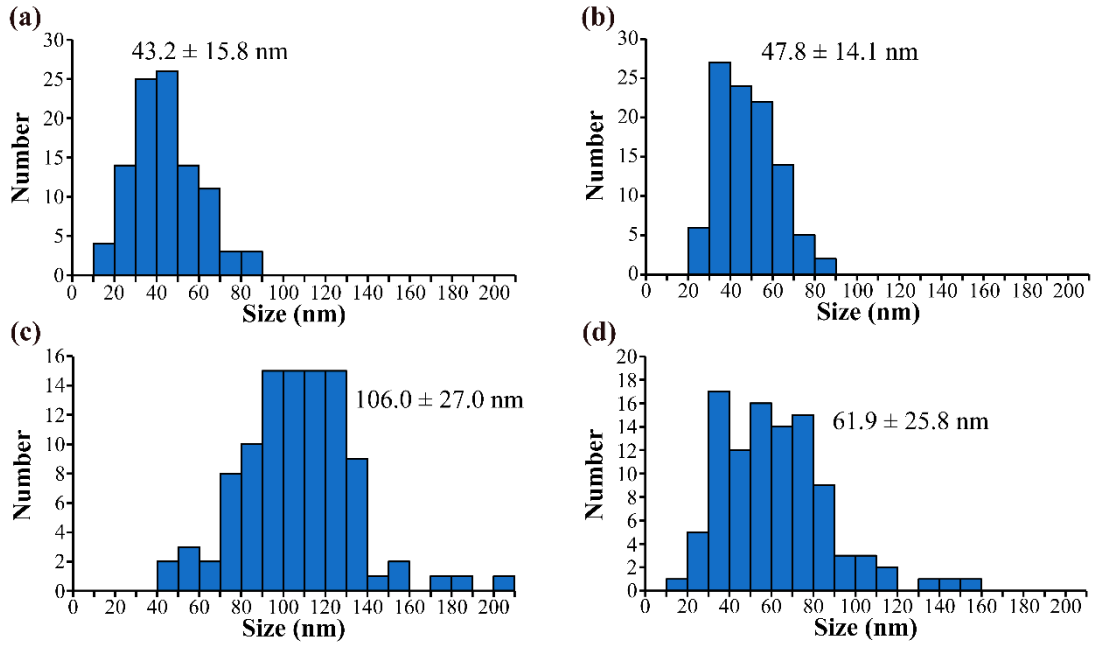


Fig. S9 Particle size histograms of the samples after gold reduction by using [W1 (beads)] = 10 μM with [$HAuCl_4$] = (a) 1 μM, (b) 10 μM, (c) 100 μM and (d) 1000 μM.

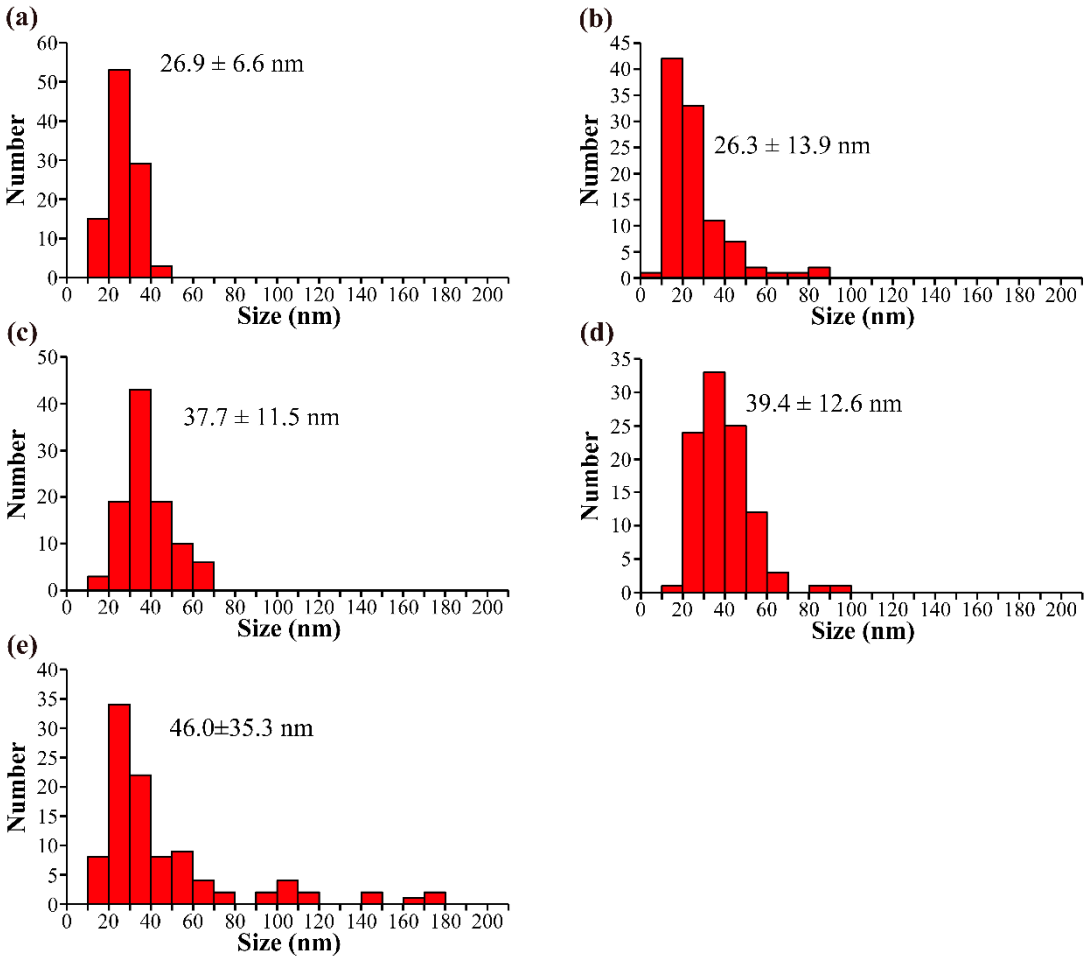


Fig. S10 Particle size histograms of the samples after gold reduction by using [W1 (beads)] = 25 μM with [$HAuCl_4$] = (a) 0.5 μM, (b) 1 μM, (c) 10 μM, (d) 100 μM and (e) 1000 μM.

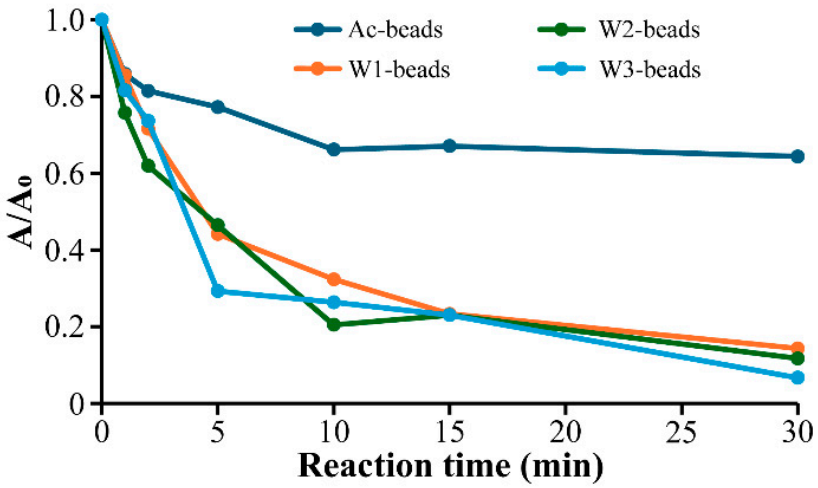


Fig. S11 Catalytic reaction progression of immobilized AuNPs prepared using W1-beads, W2-beads, W3-beads or Ac-Beads. Progression in immobilized AuNPs prepared under various conditions from 0–30 min.

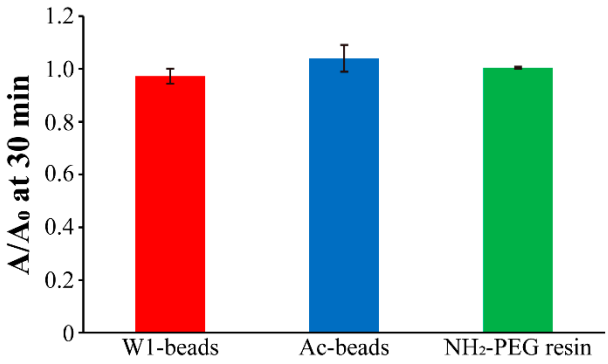


Fig. S12 Progress of 4-nitrophenol reduction after 30 min using the beads without Au ion reduction (before Au ion reduction).

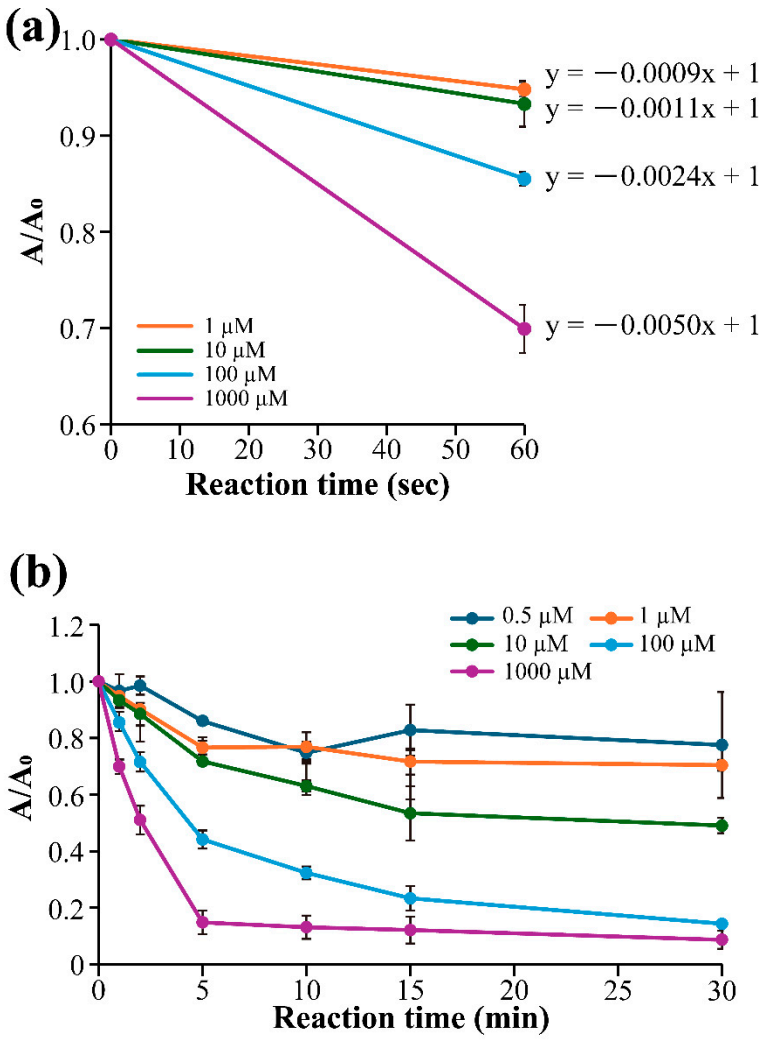


Fig. S13 Catalytic reaction progression of immobilized AuNPs prepared using W1-beads. Progression in immobilized AuNPs prepared under various conditions from (a) 0–60 sec and (b) 0-30 min.

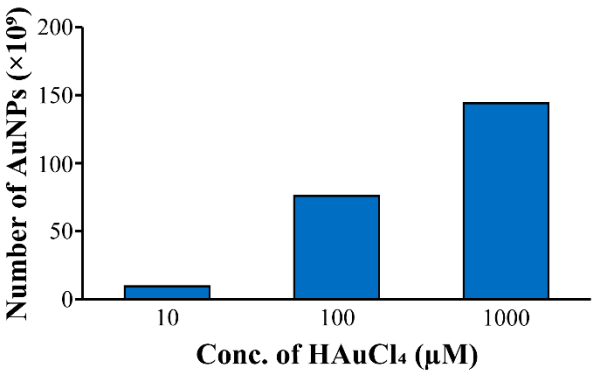


Fig. S14 The number of AuNPs immobilized on peptidyl beads.