Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics

Electronic Supplementary Information

Composition-dependent Electrocatalytic Activity of AuPd Alloy Nanoparticles Prepared via Simultaneous Sputter Deposition into an Ionic Liquid

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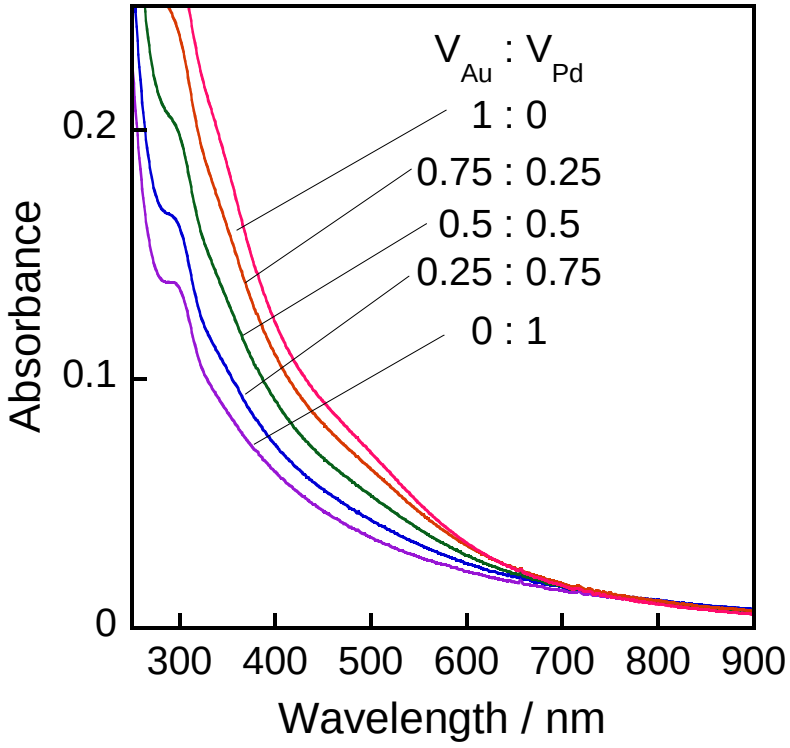

Fig. S1 Absorption spectra of the mixtures of pure Au and pure Pd nanoparticle solutions. The BMI-TFSA solutions containing pure Au or pure Pd nanoparticles were prepared at f_{Au} = 1.0 or 0, respectively. The volume ratio of the solutions in mixing (V_{Au} : V_{Pd}) is denoted in the figure.

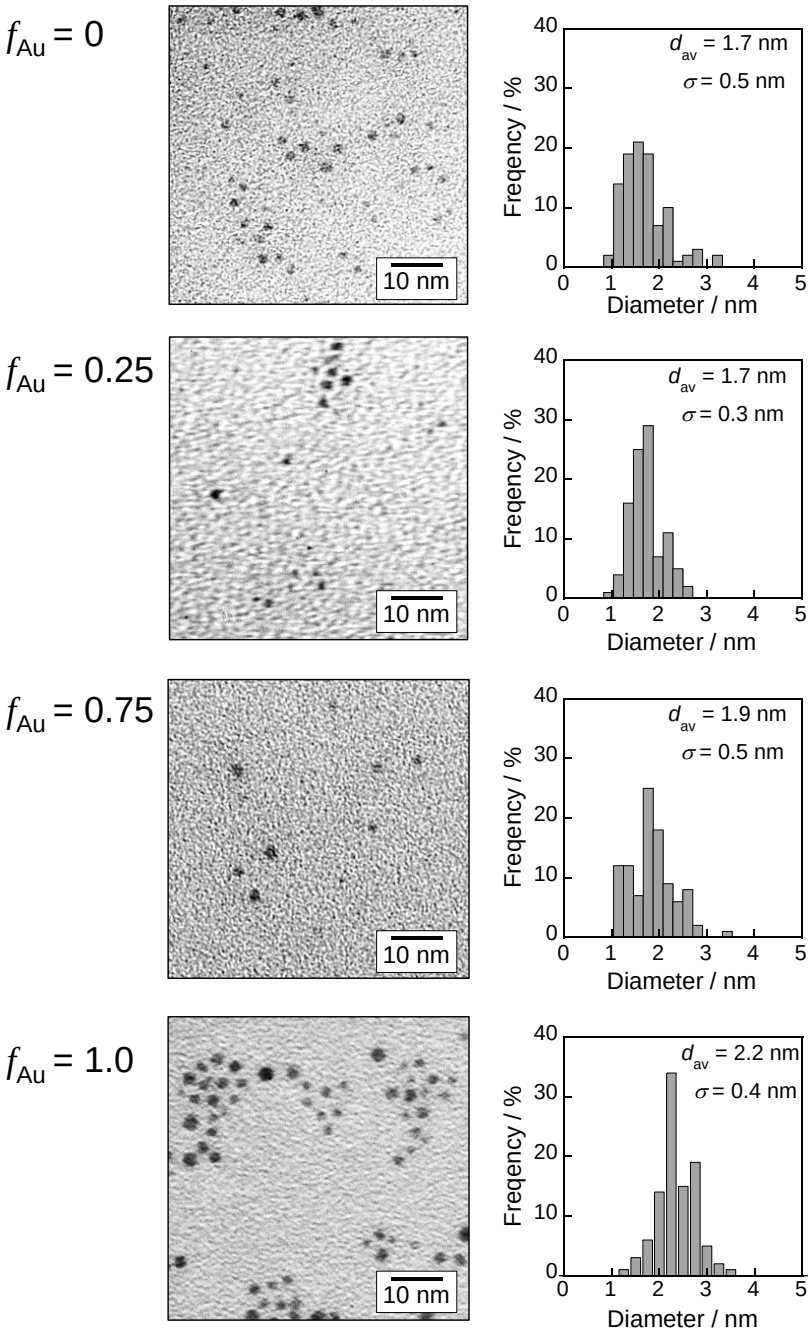

Fig. S2 TEM images and size distributions of AuPd particles sputter-deposited in BMI-TFSA with various f_{Au} values, which are denoted in the figure. The size distribution of particles is shown on the right side of the corresponding image.

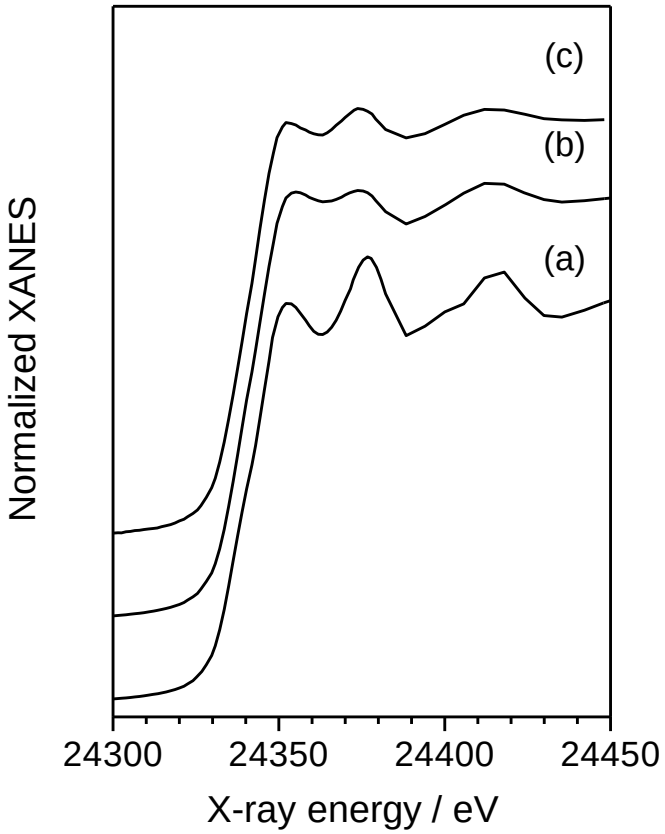

Fig. S3 Normalized XANES spectra of a metallic foil of palladium (a), pure Pd nanoparticles in BMI-TFSA (b), and AuPd nanoparticles prepared with f_{Au} = 0.50 in BMI-TFSA (c).

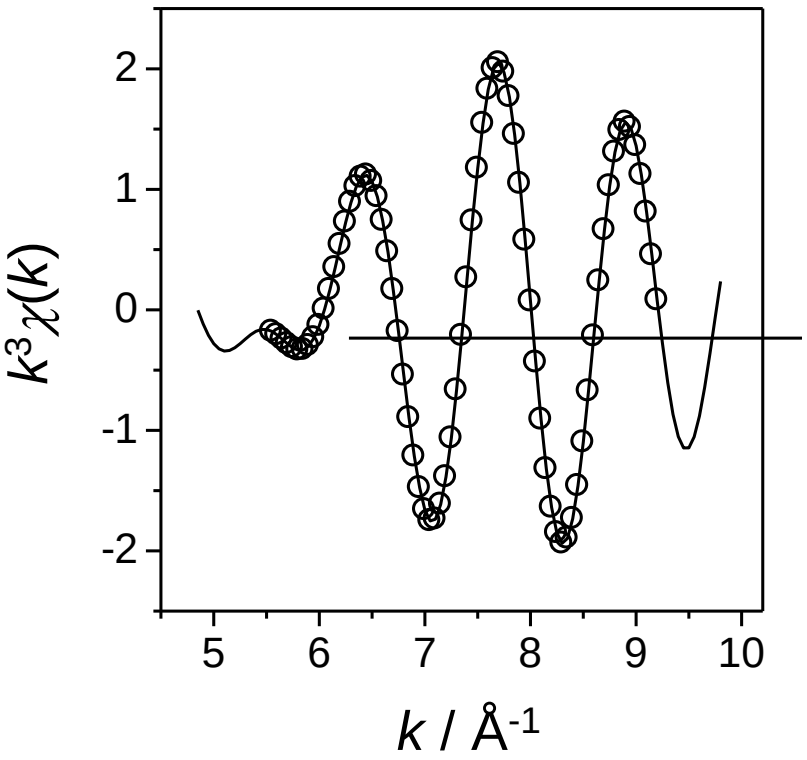

Fig. S4 Results of the curve fitting analysis for the Pd–metal shell of Fourier-filtered Pd K-edge EXAFS for AuPd particles prepared with f_{Au} = 0.50 in BMI-TFSA.

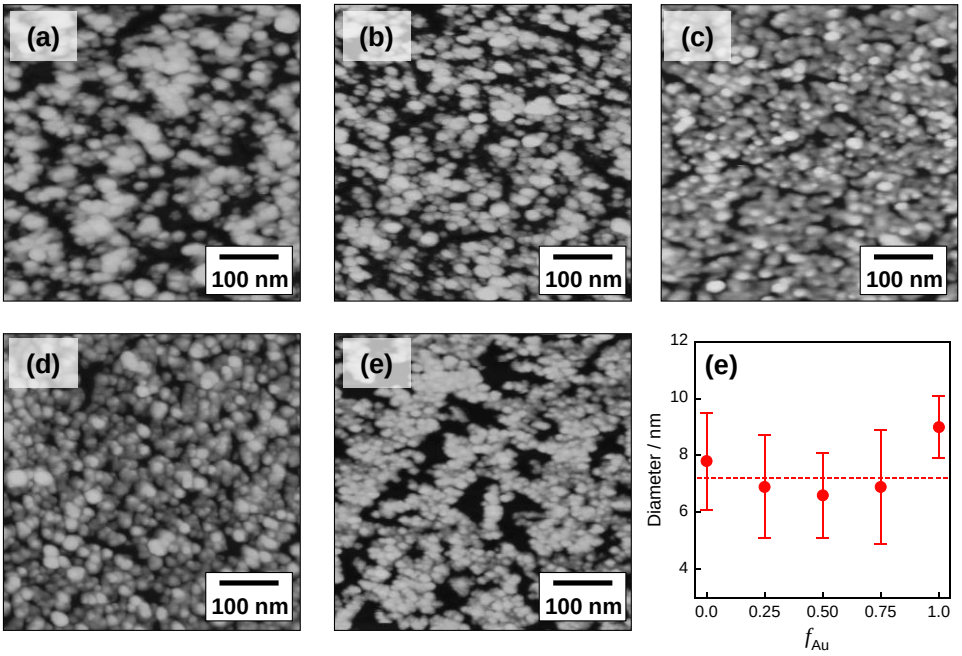

Fig. S5 (a-e) Representative AFM images of the HOPG surface with AuPd particles immobilized by heat treatment at 423 K. Nanoparticles used were prepared with f_{Au} = 0 (a), 0.25 (b), 0.50 (c), 0.75 (d) and 1.0 (e). (f) Average size of immobilized AuPd particles as a function of f_{Au}. The error bars indicate the size distribution.

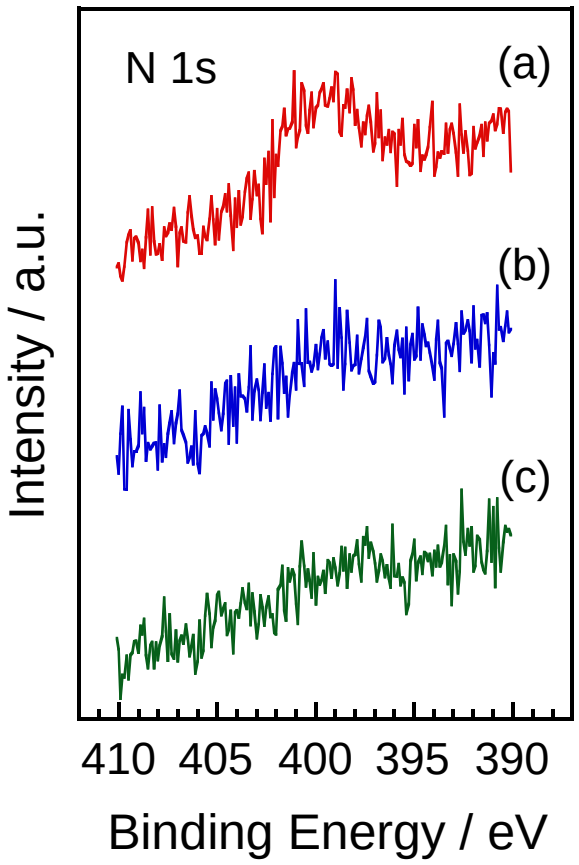

Fig. S6 XPS spectra for N 1s of AuPd particles (prepared with f_{Au} = 0.50) immobilized on HOPG electrodes. Spectra of AuPd particles were measured before (a) and after measurements of cyclic voltammograms with 30 (b) and 100 cycles (c). The conditions for preparation of electrodes were the same as those in Fig. 4.