

Supporting Information

Remote Controlled Optical Manipulation of Bimetallic Nanoparticle Catalysts using Peptides

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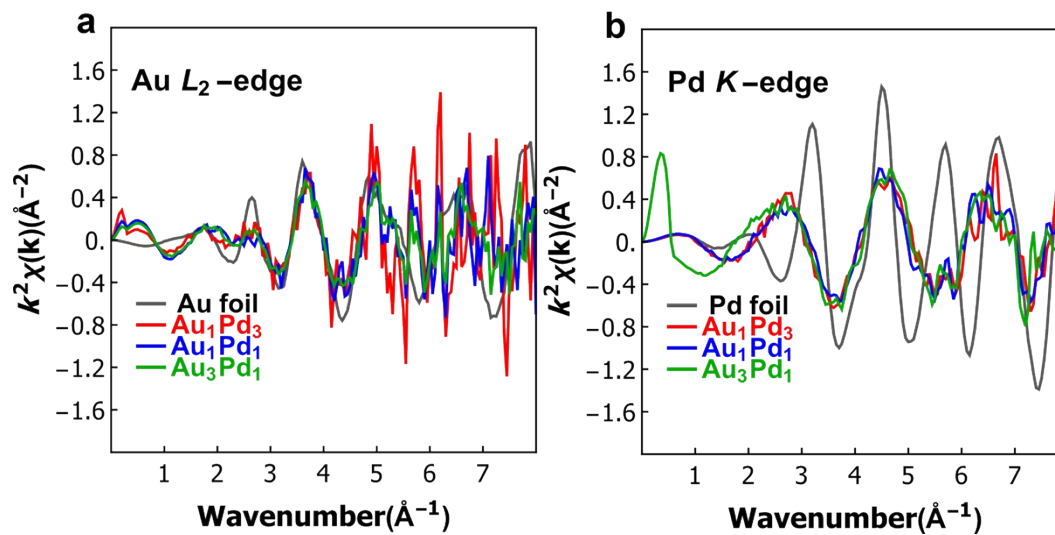


Figure S1. k^2 -weighted EXAFS data for the PdAu bimetallic materials at (a) the Au L_2 -edge and (b) the Pd K -edge. Au and Pd foils were measured as references.

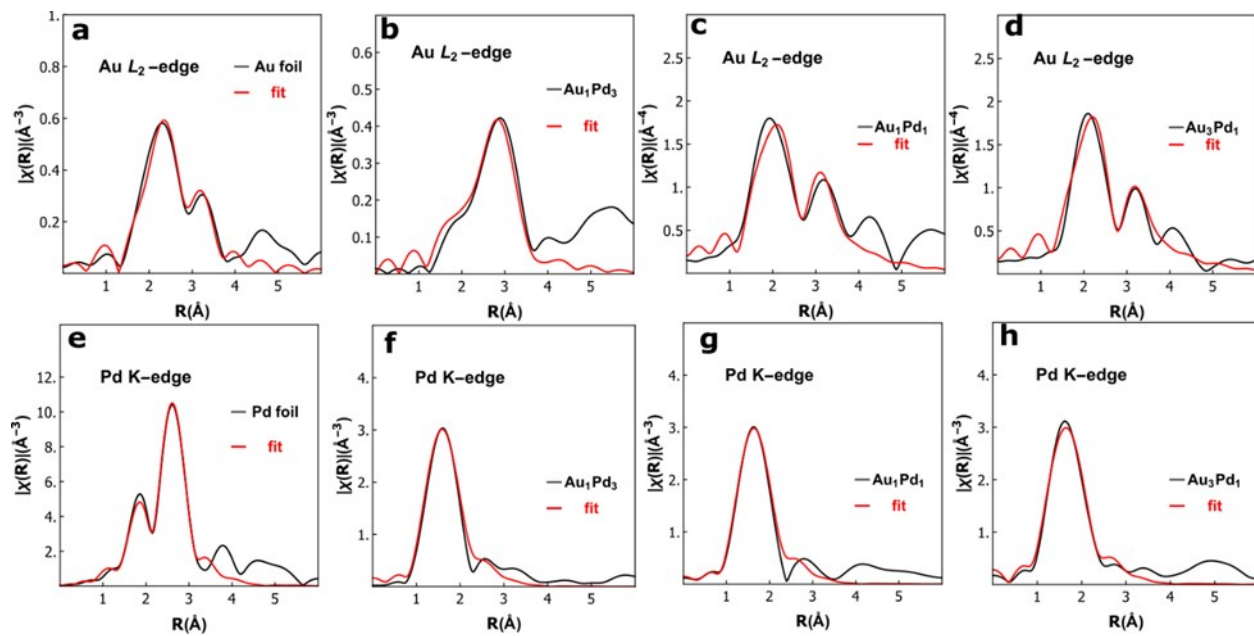


Figure S2. EXAFS data and fits for the Au L_2 -edge for (a) Au foil, (b) Au_1Pd_3 , (c) Au_1Pd_1 , and (d) Au_3Pd_1 , and the Pd K-edge for (e) Pd foil, (f) Au_1Pd_3 , (g) Au_1Pd_1 , and (h) Au_3Pd_1 .

Sample	<i>k</i> range (Au L₂-edge)	<i>r</i> range (Au L₂-edge)	<i>k</i> range (Pd K-edge)	<i>r</i> range (Pd K-edge)
Au foil	2.0 Å ⁻¹ to 7.0 Å ⁻¹	1.55 Å to 3.8 Å	--	--
Pd foil	--	--	2.0 Å ⁻¹ to 8.5 Å ⁻¹	1.0 Å to 3.1 Å
Au₁Pd₃	1.5 Å ⁻¹ to 7.0 Å ⁻¹	1.85 Å to 3.6 Å	1.5 Å ⁻¹ to 7.0 Å ⁻¹	1.0 Å to 2.3 Å
Au₁Pd₁	1.0 Å ⁻¹ to 7.0 Å ⁻¹	1.85 Å to 3.7 Å	1.5 Å ⁻¹ to 7.0 Å ⁻¹	1.0 Å to 2.4 Å
Au₃Pd₁	1.0 Å ⁻¹ to 7.0 Å ⁻¹	1.85 Å to 3.7 Å	1.5 Å ⁻¹ to 7.0 Å ⁻¹	1.0 Å to 2.4 Å

Table S1. Fitting *k* range and *r* range of the PdAu NPs.

Pd:Au		Rate constant (10^{-3} s^{-1})					Activation Energy (kJ/mol)	Frequency Factor (s^{-1})
		15°C	20°C	25°C	30°C	35°C		
3:1	<i>trans</i>	21.4 ± 7.1	27.1 ± 1.5	31.8 ± 1.2	38.7 ± 0.5	48.4 ± 9.2	29.2 ± 5.1	4.3 × 10 ³
	<i>cis</i>	24.4 ± 3.3	33.2 ± 1.4	43.7 ± 2.6	51.8 ± 6.0	66.9 ± 1.6	36.3 ± 2.8	9.7 × 10 ⁴
1:1	<i>trans</i>	20.5 ± 2.1	32.1 ± 1.0	56.2 ± 6.6	54.0 ± 1.2	41.3 ± 5.5	N/A	N/A
	<i>cis</i>	29.3 ± 3.1	32.0 ± 0.4	36.3 ± 4.0	39.7 ± 3.6	46.6 ± 3.5	16.8 ± 2.9	3.3 × 10 ¹
1:3	<i>trans</i>	28.6 ± 1.5	38.7 ± 0.01	50.3 ± 0.1	62.7 ± 0.1	72.5 ± 0.3	34.7 ± 1.8	5.8 × 10 ⁴
	<i>cis</i>	43.3 ± 2.5	53.8 ± 2.0	68.3 ± 2.4	74.6 ± 2.4	85.2 ± 2.0	24.9 ± 2.1	1.5 × 10 ³

Table S2. Summary of experimental values for bimetallic PdAu NP catalysis.

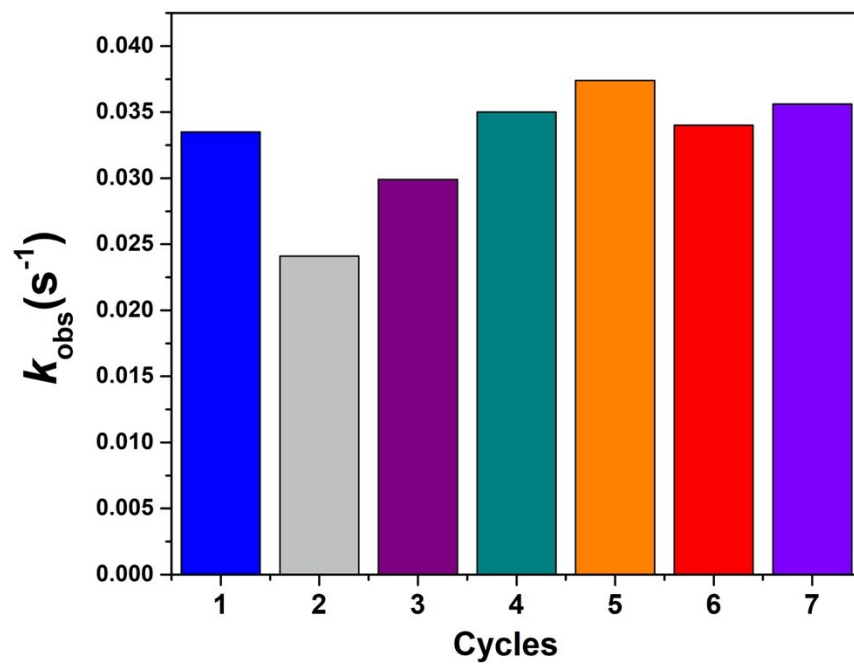


Figure S3. Catalytic recyclability analysis using the bimetallic NPs prepared at a Pd:Au ratio of 1:3 at $\sim 20^{\circ}\text{C}$.