Electronic Supplementary Information

Effect of electronic coupling on the eletctrocatalytic performance of platinum metal

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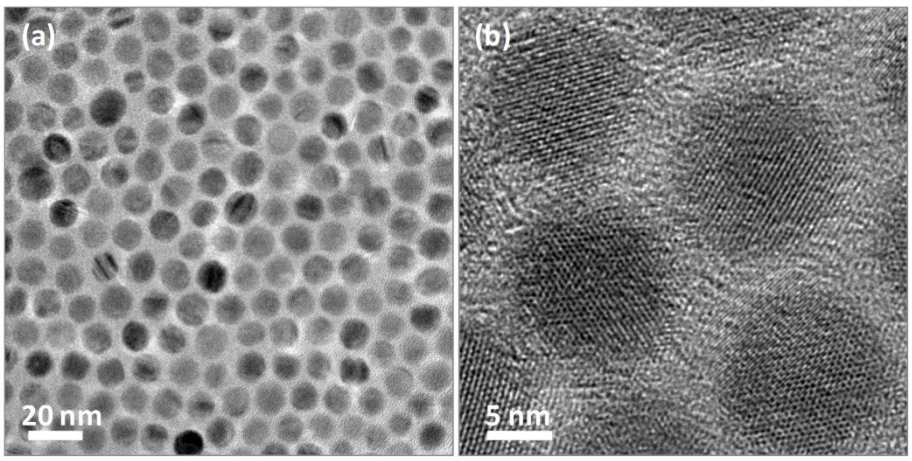

Fig. S1 TEM image (a) and HRTEM image (b) of Ag seed particles with single crystal phase prepared by $NaBH_4$ reduction of $AgNO_3$ in aqueous solution.

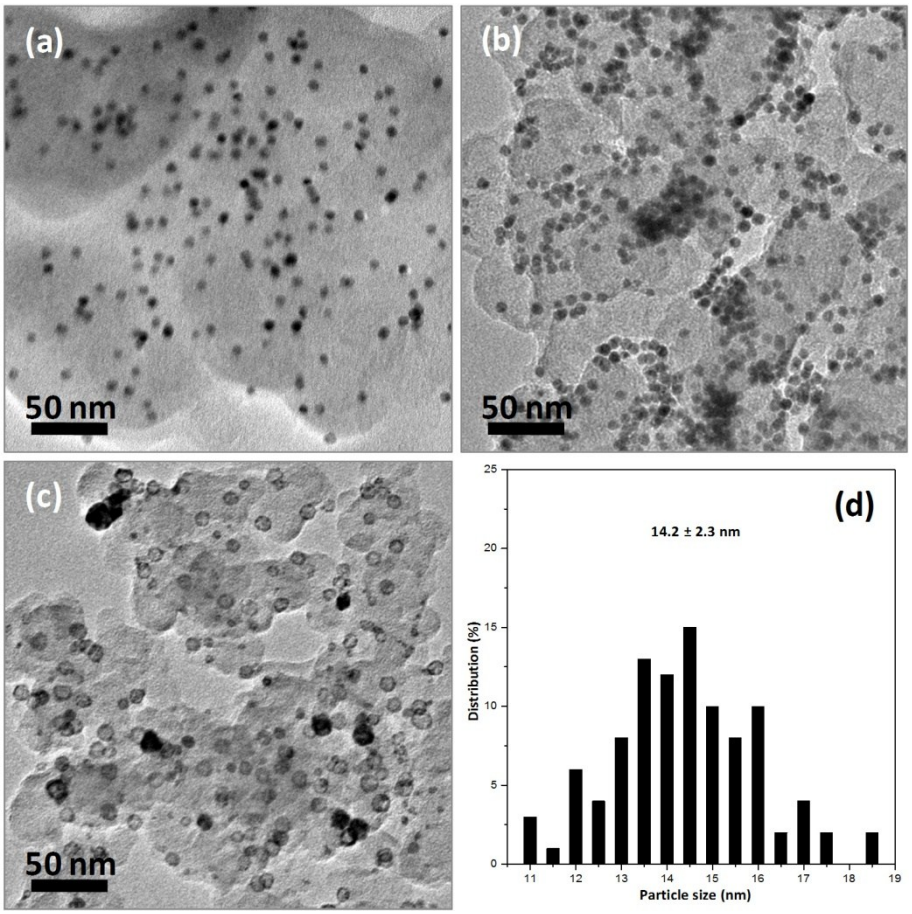

Fig. S2 TEM images of core-shell Ag-Pt (a), core-shell Au-Pt (b), and hollow structured Pt nanoparticles (c) loaded on Vulcan carbon supports, and histogram to show the size distribution of hollow Pt nanoparticles (d).

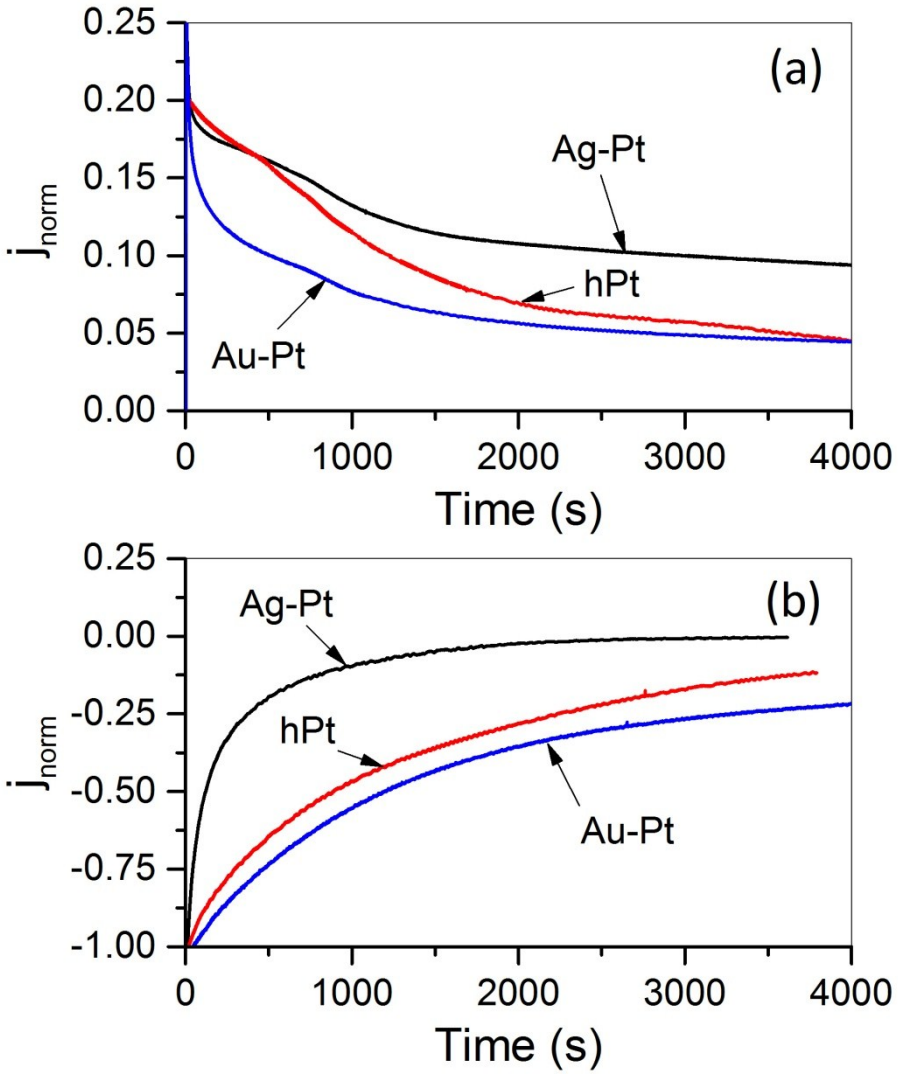

Fig. S3 Chronoamperograms of core-shell Ag-Pt, Au-Pt, and hollow Pt nanoparticles at 0.45 V vs Ag/AgCl at room temperature in argon-purged 0.1 M $HClO_4$ with 1 M methanol (a); chronoamperograms at 0.45 V (c) over core-shell Ag-Pt, Au-Pt, and hollow Pt nanoparticles in O_2 saturated 0.1 M $HClO_4$ electrolyte at a scan rate of 20 mV s^{-1} and a rotating rate of 1600 rpm (b).

Table S1. Electrochemical measurements of methanol oxidation on hollow Pt, core-shell Ag-Pt, and Au-Pt nanoparticles.

Catalyst	FPP (V)	FPCD (mA cm^{-2})	BPP (V)	BPCD (mA cm^{-2})
Hollow Pt	0.69	32.8	0.55	25.4
Ag-Pt	0.72	43.7	0.60	39.9
Au-Pt	0.73	28.7	0.62	22.9

FPP: Forward peak potential; FPCD: Forward peak current density; BPP: Backward peak potential; BPCD: Backward peak current density. The data were obtained from Figure 4b.

Table S2. Comparison of the catalytic activity of hollow Pt, core-shell Ag-Pt, and Au-Pt nanoparticles for the oxugen reduction. The data were obtained from Figure 4c.

Material	Half-Wave Potential at 1600 rpm (V)	Kinetic Current Density at Half-Wave Potential (mA·cm^{-2})
Hollow Pt	0.61	12.6
Ag-Pt	0.57	7.71
Au-Pt	0.65	14.7