Supporting Information

The Effect of Alloying on the Oxygen Reduction Reaction Activity of Carbon-supported PtCu and PtPd Nanorods

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Table S1 ICP and XPS characterizations of Pt/C and various NRs.

Sample	Chemical compositions [a] (at %)	Surface compositions [b] (at %)
	Pt/M	Pt/M
Pt/C	100/0	100/0
Pt	100/0	100/0
Pt5Cu	85/15	80/20
Pt3Cu	73/27	70/30
PtCu5	16/84	28/72
Pt3Pd	77/23	74/26
PtPd	50/50	52/48
PtPd3	25/75	30/70

[a] The chemical compositions are measured by ICP.

[b]The surface compositions are measured by XPS.

Table S2 The comparisons of I_k, ECSA, SA, and MA for Pt/C and various NRs.

Sample	I_{k085} (mA/cm^2)	ECSA ($cm^2_{H\ Charge}$)	SA_{085} ($\mu A/cm^2_{H\ Charge}$)	MA_{085} (mA/mg_{Pt})
Pt/C	0.98	53.04	3.63	23
Pt	1.19	41.23	5.66	38
Pt5Cu	1.95	63.88	5.99	50
Pt3Cu	2.37	30.05	18.02	113
PtCu5	0.09	19.40	0.91	8
Pt3Pd	4.57	41.46	21.63	115
PtPd	1.72	37.10	9.10	58
PtPd3	0.24	32.27	1.46	14

Table S3 Electrochemical results of Pt/C, Pt, Pt3Cu, and Pt3Pd catalysts.

Sample	SA ($\mu A/cm^2_{H\ Charge}$)			Electron transfer number (n)	MA(mA/mg_{Pt})		
	SA_{085}	$SA_{085-1000}$	$SA_{085-1000}/SA_{085}$ (%)		MA_{085}	$MA_{085-1000}$	$MA_{085-1000}/MA_{085}$ (%)
Pt/C	3.63	2.21	60.88	4.0	23	11	47.83
Pt	5.66	3.57	63.07	3.7	38	18	47.37
Pt3Cu	18.02	5.70	31.63	3.3	113	29	25.66
Pt3Pd	21.63	17.81	82.34	3.7	115	95	82.61

Table S4 The MA_{085}, SA_{085}, A_2, A_3 and total number of unfilled d-states (H_{Ts}) as obtained from XAS experiments for Pt/C, Pt, and various NRs.

Sample	MA_{085} (mA/mg $_{Pt}$)	SA_{085} ($\mu A/cm^2$ $_{H\ Charge}$)	A_2	A_3	H_{Ts}
Pt/C	23	3.63	15.03	19.50	0.3375
Pt	38	5.66	13.69	18.52	0.3141
Pt5Cu	50	5.99	13.43	18.32	0.3126
Pt3Cu	113	18.02	12.72	18.32	0.3081
PtCu5	8	0.91	14.31	18.37	0.3189
Pt3Pd	115	21.63	12.59	18.15	0.3056
PtPd	58	9.10	13.23	17.99	0.3088
PtPd3	14	1.46	13.18	18.51	0.3144

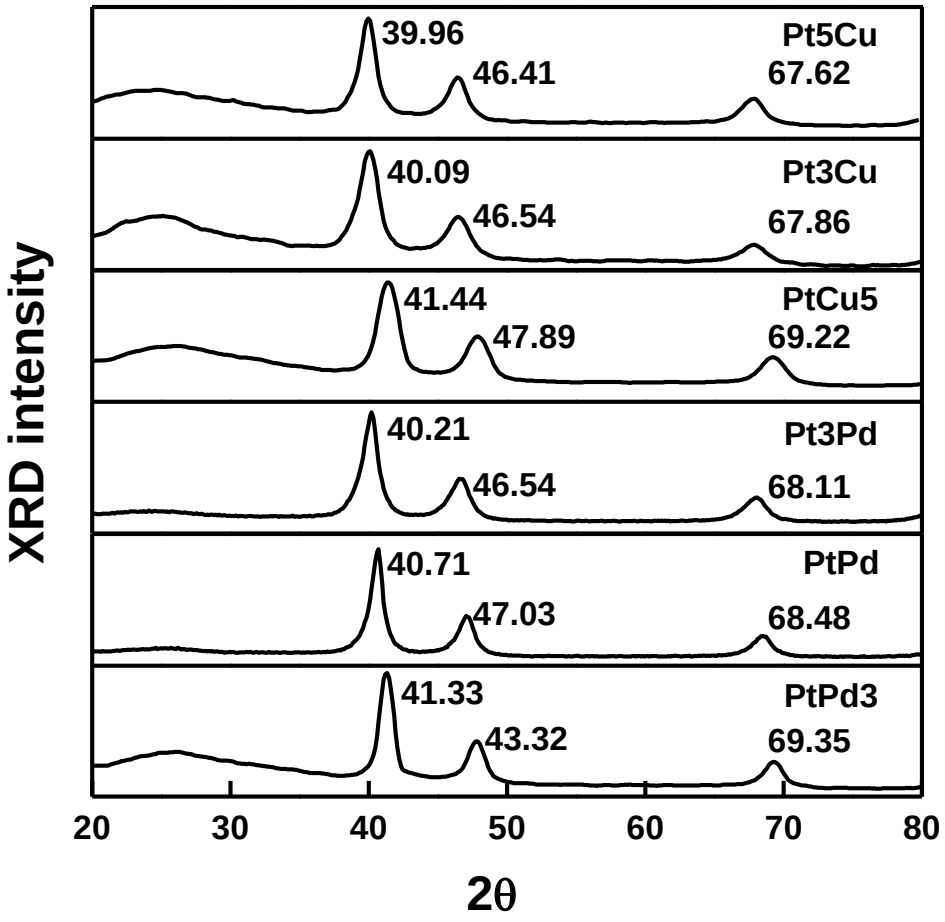


Figure S1 XRD patterns of Pt5Cu, Pt3Cu, PtCu5, Pt3Pd, PtPd, and PtPd3 NRs.

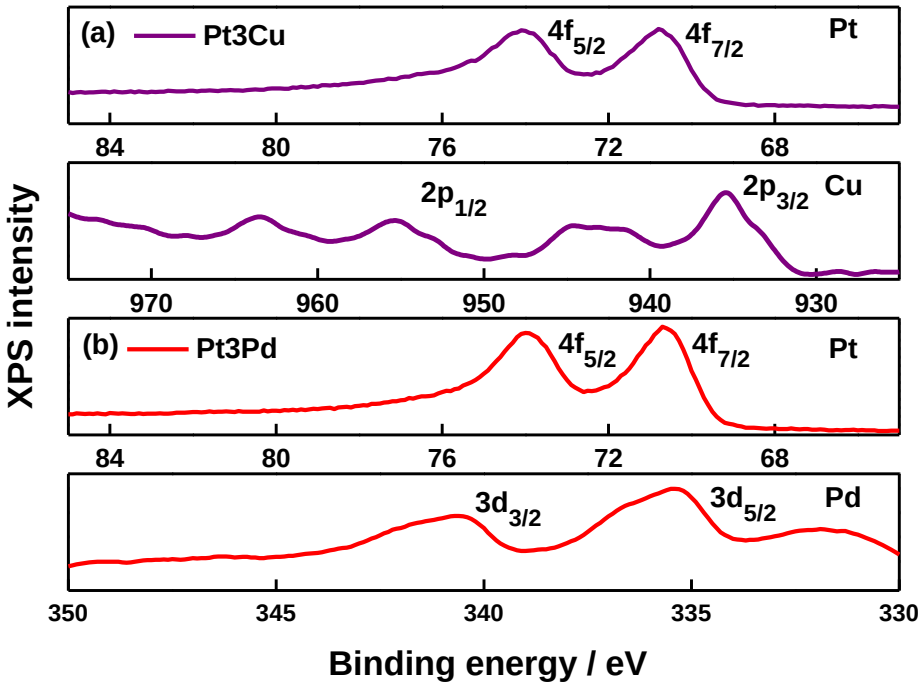


Figure S2 XPS spectra of (a) Pt3Cu and (b) Pt3Pd NRs.

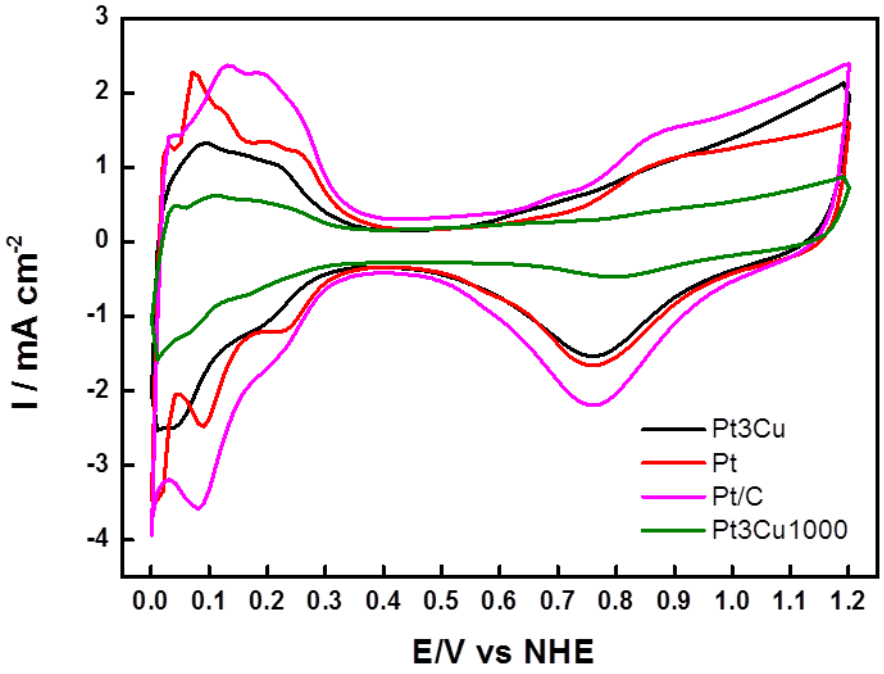
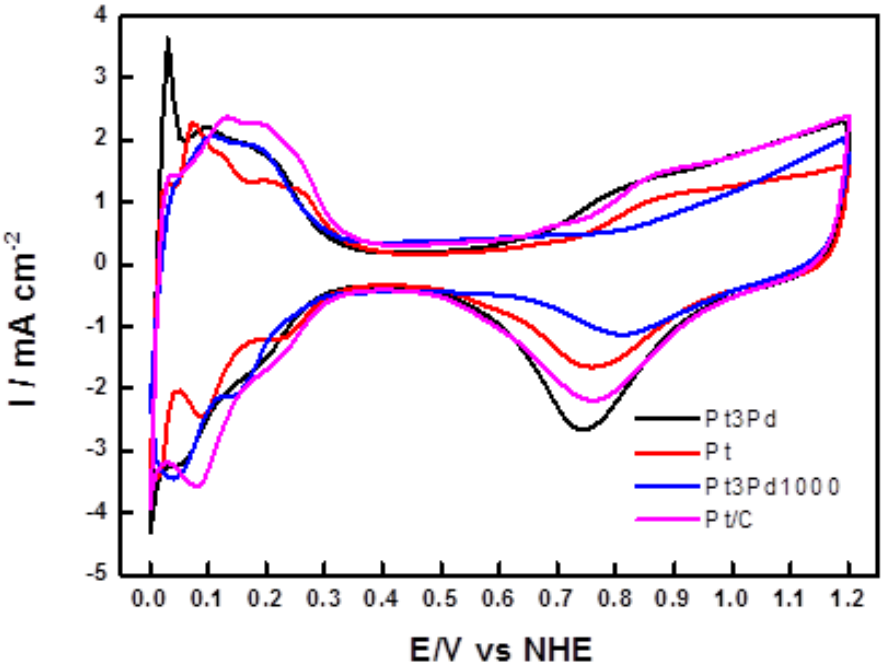


Figure S3 CV scans of as-prepared Pt/C, as-prepared Pt, and Pt3Cu NRs obtained in 0.5 M $HClO_4$ saturated with N_2 before and after ADT of 1000 potential cycles.



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