Electronic Supplementary Material (ESI) for Nanoscale.

Low-Pt-Content Ternary PdCuPt Nanodendrites: An Efficient Electrocatalyst for Oxygen Reduction Reaction

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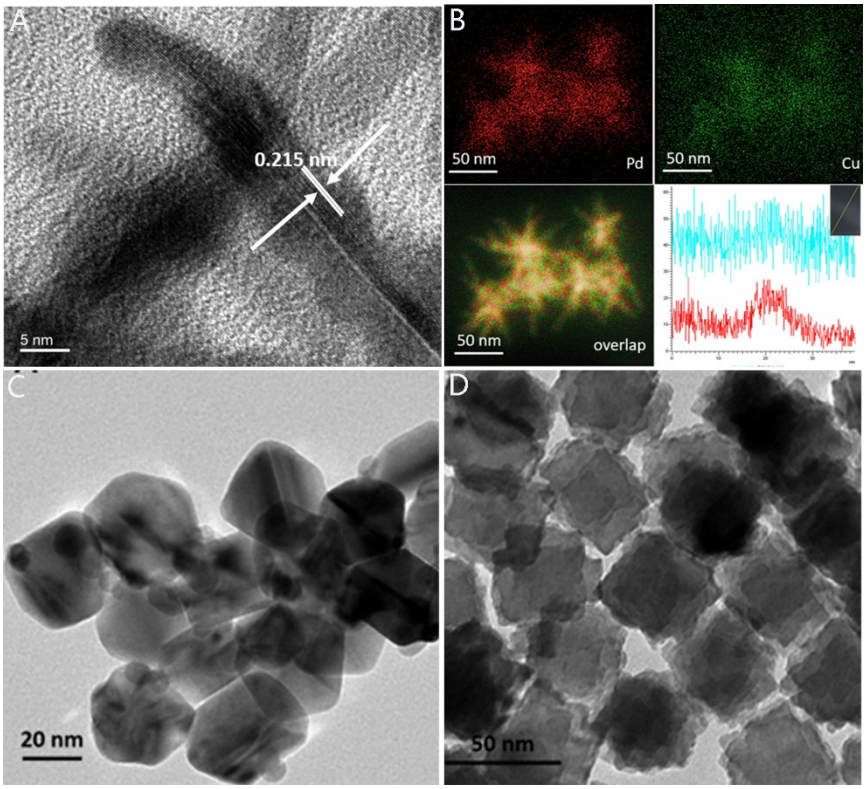

Figure S1. (A) HRTEM image of PdCu NDs. (B) EDS mapping and line scan profile of PdCu NDs. TEM images of Pd (C) and PtPd (D) nanostructures under the typical synthesis condition.

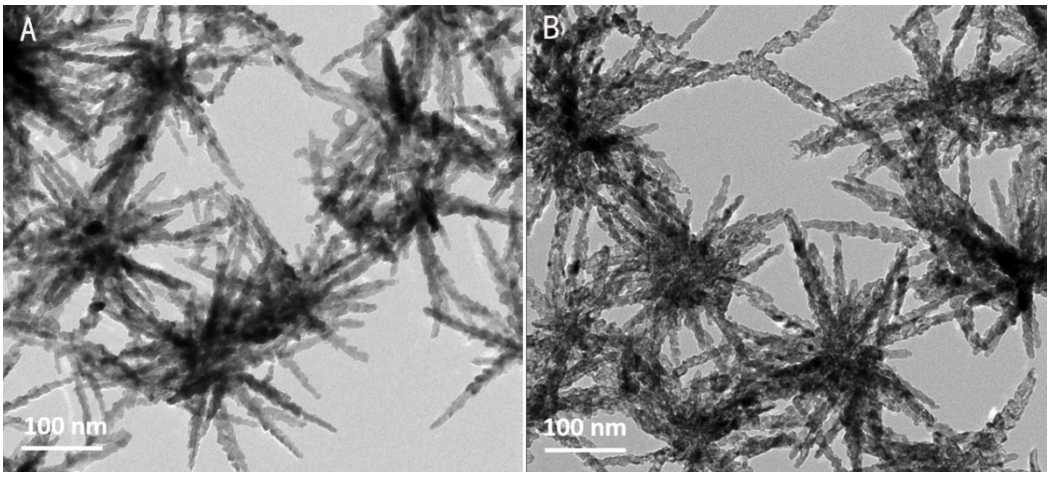

Figure S2. TEM images of $Pd_{85}Cu_9Pt_6$ (A) and $Pd_{69}Cu_5Pt_{26}$ (B) NDs.

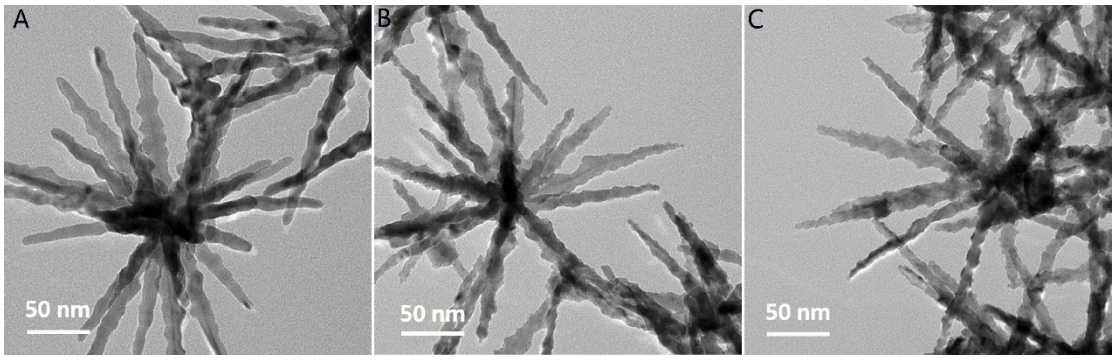

Figure S3. TEM images of PdCuPt NDs obtained at 5 (A), 15 (B), and 30 min (C).

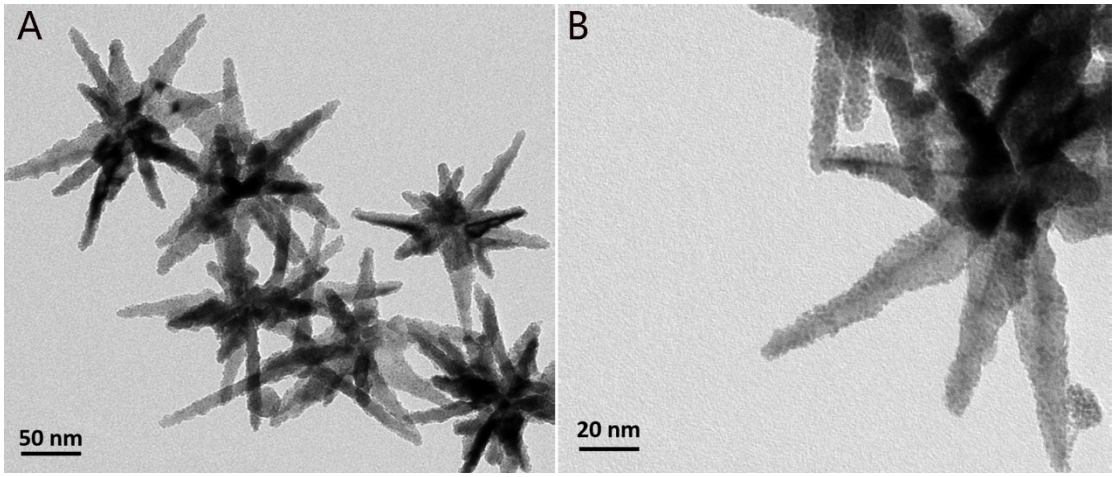

Figure S4. TEM images of PdCuPt NDs synthesized under the typical condition without the addition of KBr.

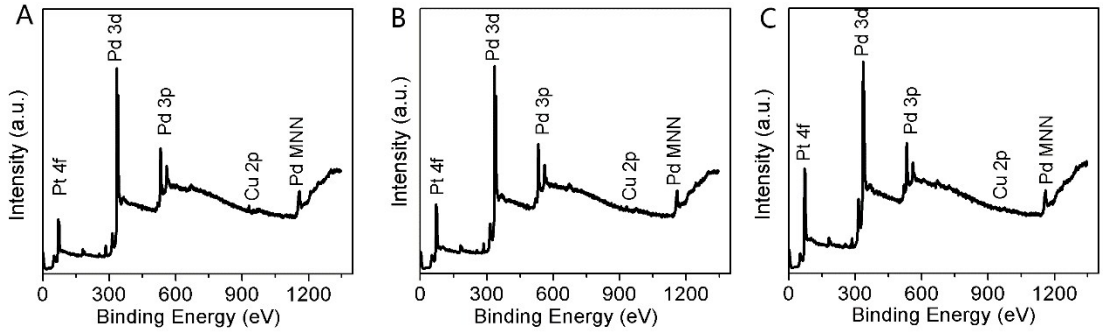

Figure S5. XPS spectra of PdCuPt NDs

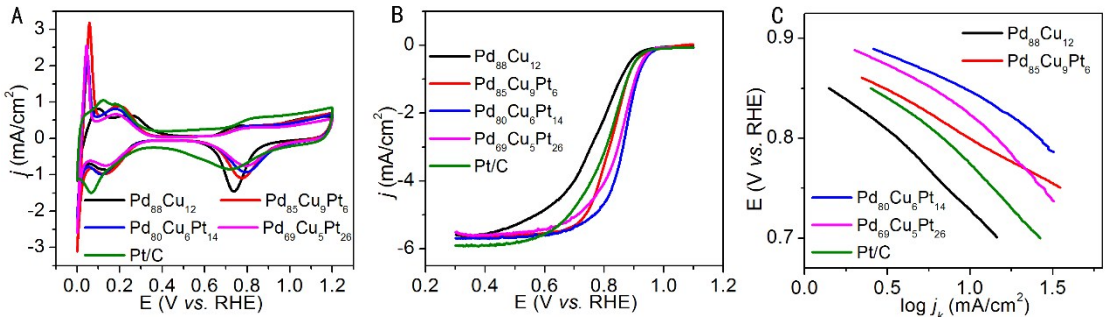

Figure S6. Electrocatalytic properties of PdCu, PdCuPt NDs and commercial Pt/C

catalysts. (A) CV curves of the catalysts in N_2-saturated 0.1 M $HClO_4$ solution at a sweep rate of 50 mV/s. ORR polarization curves (B) and corresponding Tafel plots (C) of the catalysts in O_2-saturated 0.1 M $HClO_4$ solution at a sweep rate of 10 mV/s and a rotation rate of 1600 rpm.

Table S1. Electrochemical ORR parameters of PdCu, PdCuPt NDs and commercial Pt/C catalyst.

	ECSA (m^2/g)	Onset potential (V)	Half-wave potential (V)	MA @0.9 V (A/mg_{Pt})	MA @0.9 V (A/mg_{Pt+Pd})	SA @0.9 V (mA/cm^2)	Tafel slope (mV/decade)
$Pd_{88}Cu_{12}$	NA	0.902	0.767	NA	0.02	NA	111
$Pd_{85}Cu_9Pt_6$	89	0.917	0.819	0.46	0.03	0.033	86
$Pd_{80}Cu_6Pt_{14}$	84	0.933	0.864	0.54	0.08	0.095	66
$Pd_{69}Cu_5Pt_{26}$	68	0.931	0.849	0.26	0.07	0.1	82
Pt/C	83	0.908	0.809	0.03	0.03	0.036	98

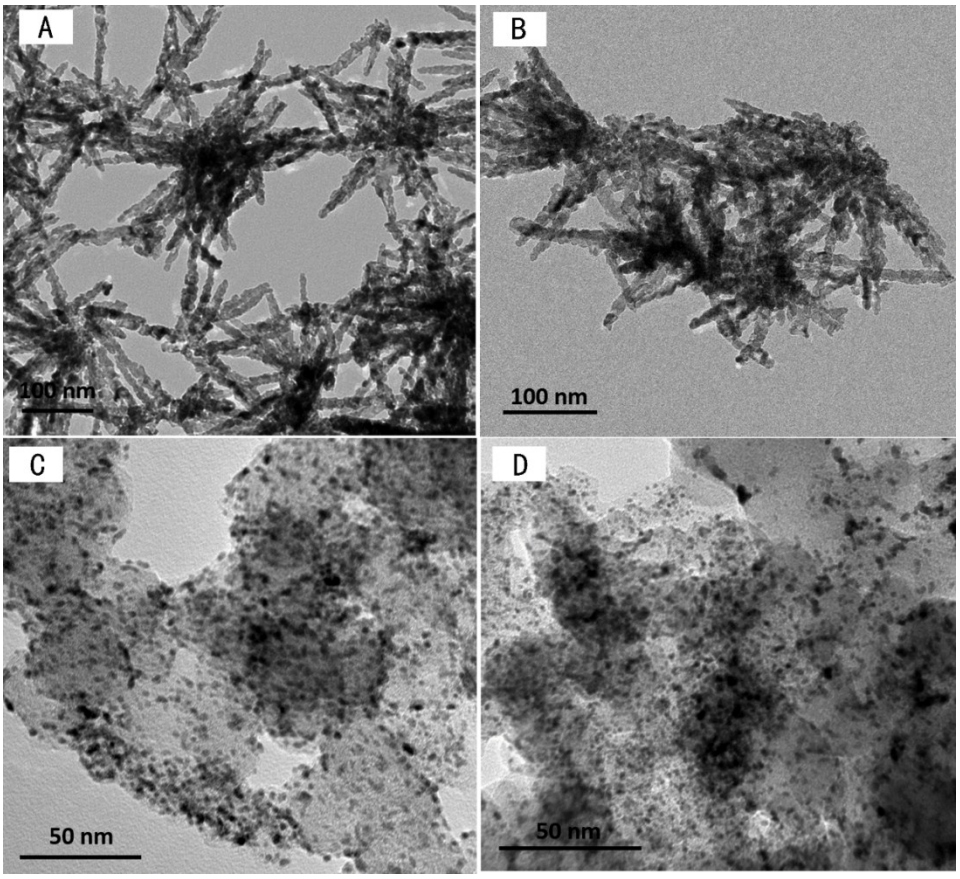

Figure S7. TEM images of $Pd_{80}Cu_6Pt_{14}$ before (A) and after (B) durability tests. TEM images of commercial Pt/C before (C) and after (D) durability tests.