

Supporting information for

Rational One-Step Synthesis of Porous PtPdRu Nanodendrites for Ethanol Oxidation Reaction with a Superior Tolerance for CO-poisoning

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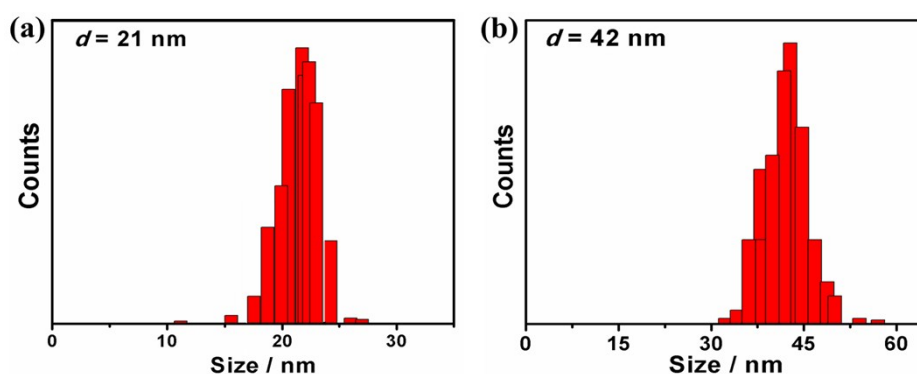


Figure S1. (a) Histogram of the particle size distribution of PtPdRu PNDs and (b) PtPdRu NFs.

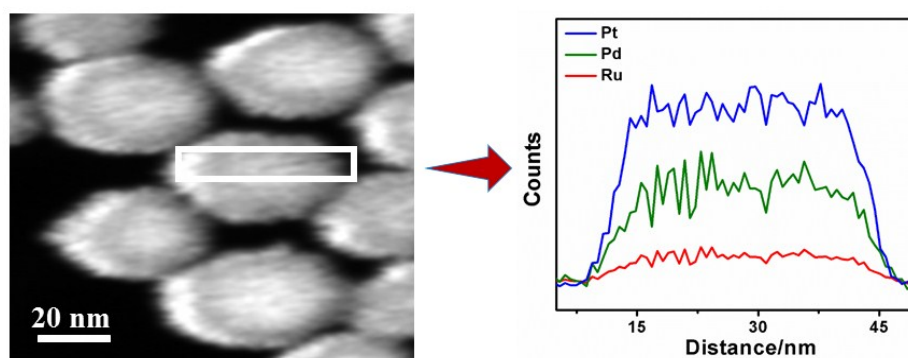


Figure S2. (a) HAADF-STEM image of PtPdRu NFs and its EDS-line scanning profile.

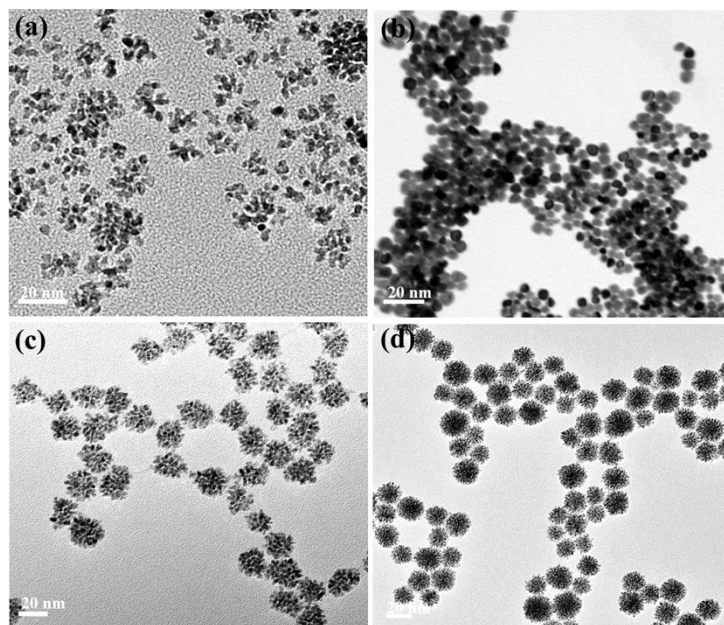


Figure S3. TEM image of (a) Pt NDs, (b) Pd NCs, (c) PtPd NDs, and (d) PtRu NDs prepared under typical synthetic conditions.

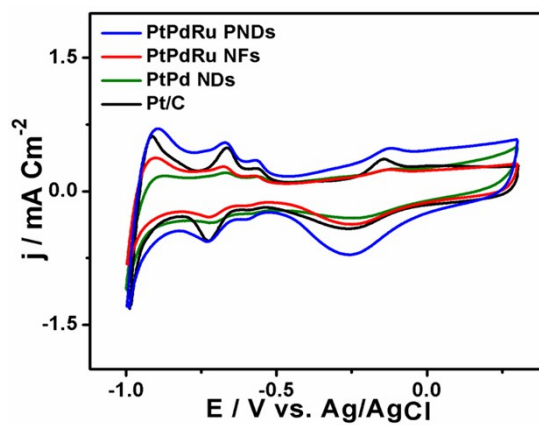


Figure S4. CVs of different catalyst measured in N₂ saturated 1 M NaOH at a scan rate of 50 m V s⁻¹.

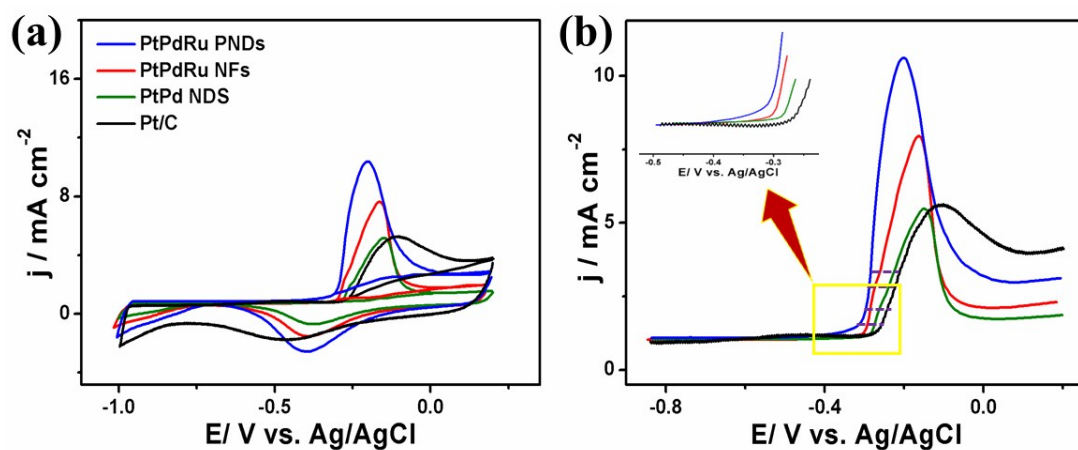


Figure S5. (a) CO-stripping voltammograms of different catalyst measured in CO-saturated 1 M NaOH at a scan rate of 50 mV s^{-1} and (b) the CO-peaks adsorbed on different catalysts. The inset in (b) shows the magnification for the marked area.

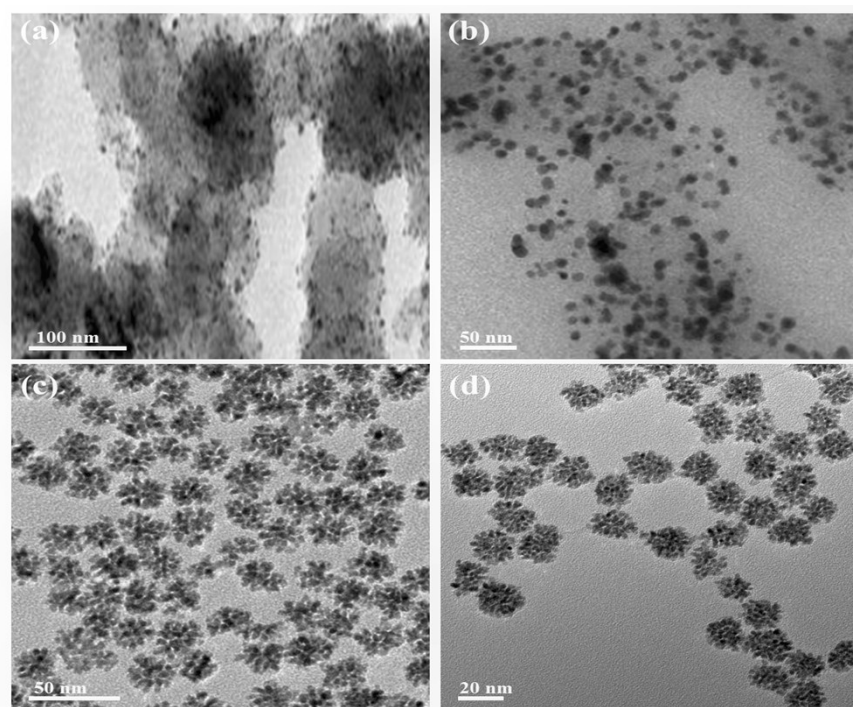


Figure S6. (a-b) and (c-d) TEM images of commercial Pt/C and PtPdRu PNDs before and after EOR durability test, respectively.

Table S1. Comparisons of the surface area of our newly synthesized PtPdRu PNDs with previously reported Pt-based NCs. The surface areas were measured by the N₂ adsorption desorption isotherm.

Catalysts	Morphology	Surface area m ² g ⁻¹	References
PtPdRu	Porous nanodendrites	79	This work
Pt ₂₀ Pd ₂₀	Aerogel	75	¹ <i>Angew. Chem. Int. Ed.</i> 2013 , <i>52</i> , 9849-9852.
PtNi	nanodendrites	57.3	² <i>Chem. Asian J.</i> 2016 , <i>11</i> , 1388 – 1393
PtCu	Porous nanodendrites	54.1	³ <i>Nanoscale</i> , 2015 , <i>7</i> , 16860–16866
PtPd	Nanocages	53	⁴ <i>J. Am. Chem. Soc.</i> 2013 , <i>135</i> , 16762-16765.
Pt	Nanowires	53	⁵ <i>Nano Lett.</i> 2007 , <i>7</i> , 3650-3655.
Pd@Pt	Mesoporous concave	40	⁶ <i>Angew. Chem. Int. Ed.</i> 2013 , <i>52</i> , 13611-13615.

Table S2. Comparisons of the mass activity of PtPdRu PNDs with previously reported Pt-based nanostructures measured in 1 M ethanol in alkaline medium at a scan rate of 50 mV s⁻¹.

Catalyst	Morphology	Mass activity (mA μg ⁻¹)	References
PtPdRu	Porous nanodendrites	16.32	This work
Au ₉₃ Pt ₇	Nanowire	15.9	⁷ <i>Chem. Commun.</i> , 2016 , <i>52</i> , 5164
Pt ₇₀ Pd ₂₃ Bi ₇ /C	Nanowires	14.55	⁸ <i>RSC Adv.</i> , 2016 , <i>6</i> , 58336-58342
Pt ₁ Ru _{0.5} Sn _{0.5} -RGO	Nanospheres	14.5	⁹ <i>J. Colloid. Interface. Sci.</i> , 2017 , doi.org/10.1016/j.jcis.2017.06.098
Pt-Au	Nanodimer	9.2	¹⁰ <i>Nanoscale</i> , 2015 , <i>7</i> , 8739
Au@(Pt + Pd)/C	Quasi-monolayer	8.99	¹¹ <i>Chem. Commun.</i> , 2016 , <i>52</i> , 374
PtPd	Dandelion-like	4.95	¹² <i>Electrochimica Acta</i> 159 , 2015 , 40-45
Au ₁₇ Pt ₂₄ Pd ₅₉	Nanowire	3.2	¹³ <i>J. Mater. Chem.</i> , 2012 , <i>22</i> , 14851

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