Electronic Supplementary Information for

Synthesis of Pd Nanonetworks with Abundant Defects for Oxygen Reduction Electrocatalysis

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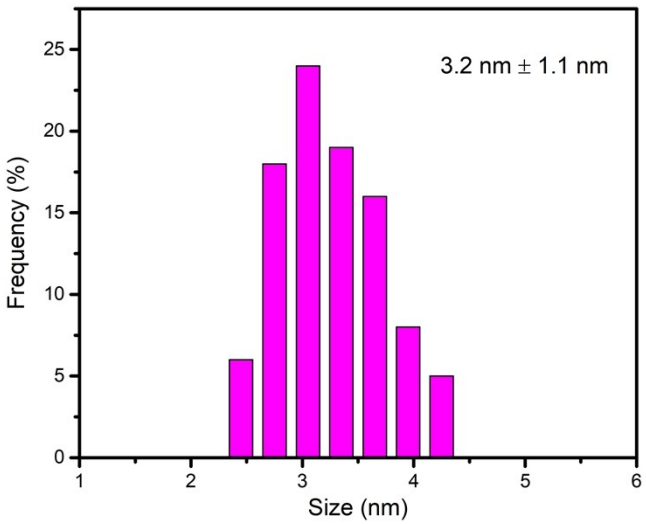

Fig. S1. Size distribution of Pd nanonetworks prepared through standard procedure.

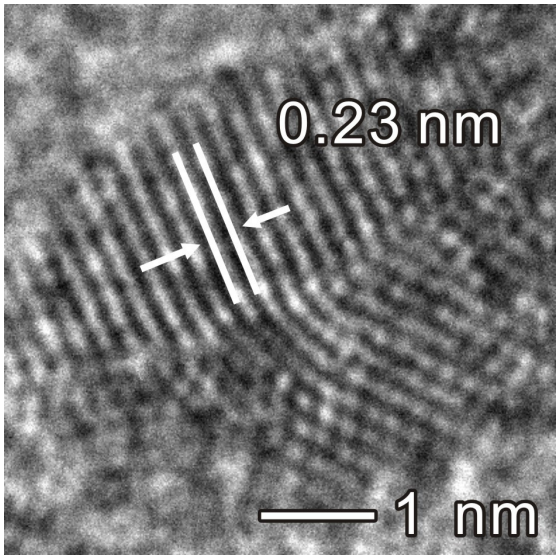

Fig. S2. The magnified HRTEM image taken from the Fig. 1c marked by corresponding blue box.

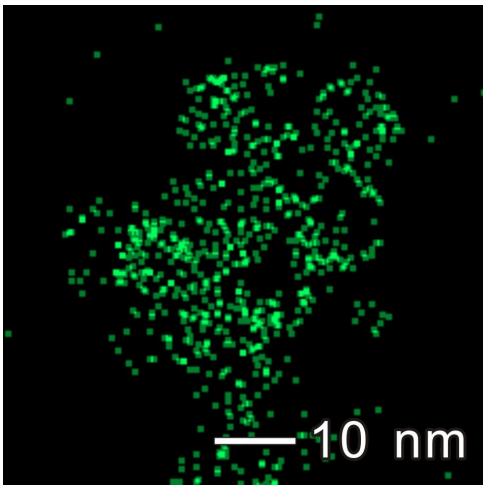

Fig. S3. The the corresponding energy-dispersive X-ray spectroscopy mapping of Pd atoms for Fig. 1b.

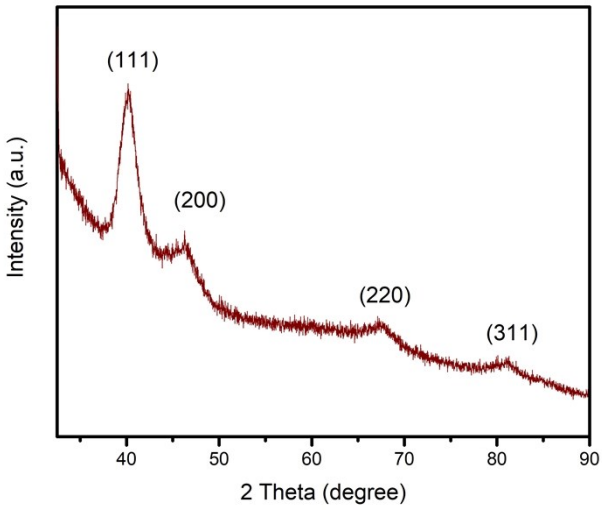

Fig. S4. The XRD pattern of Pd nanonetworks prepared through standard procedure.

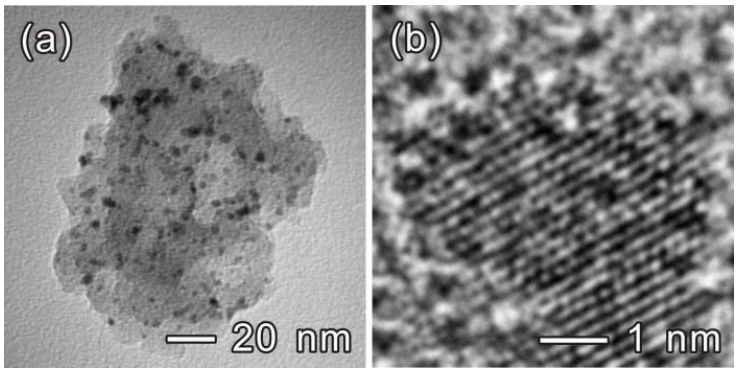

Fig. S5. The TEM image (a) and HRTEM image (b) of the commercial Pd/C nanocatalysts.

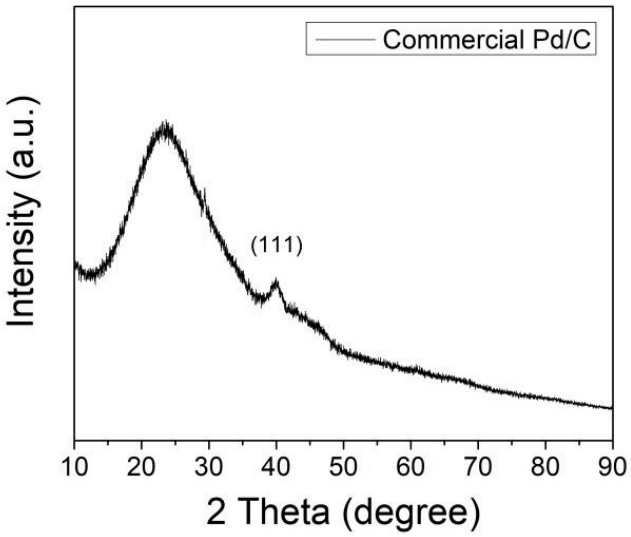

Fig. S6. The XRD pattern of the commercial Pd/C nanocatalysts.

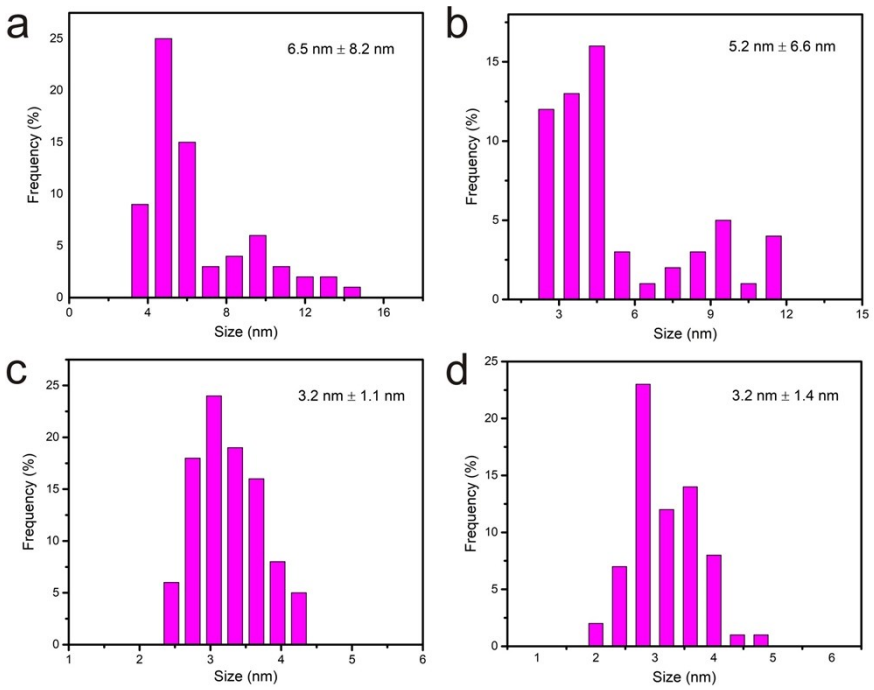

Fig. S7. Size distribution of Pd nanonetworks prepared through standard procedure except for the different reactant concentrations, (a) 0.5 mg/mL, (b) 1 mg/mL, (c) 2 mg/mL, and (d) 5 mg/mL.

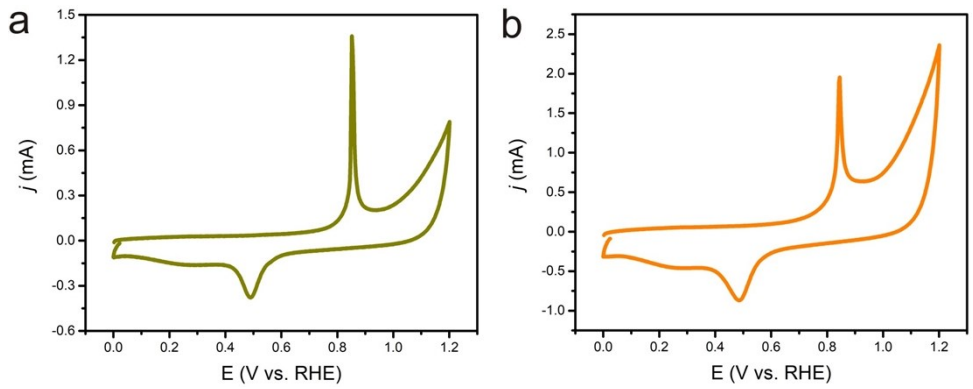

Fig. S8. CO-stripping curves of the commercial Pd/C and Pd nanonetworks.

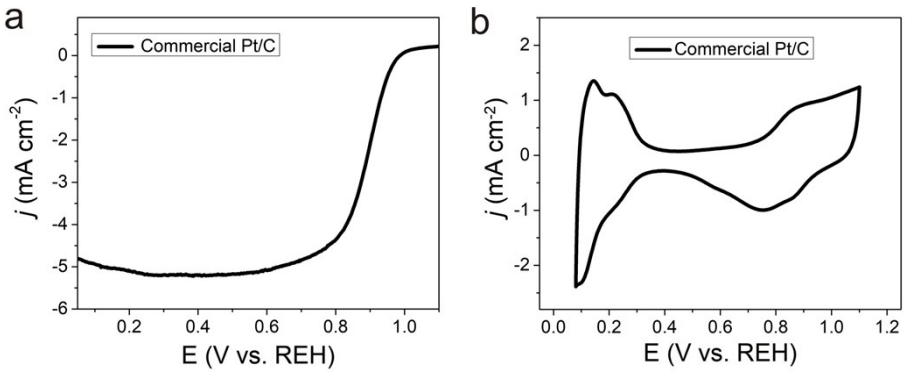

Fig. S9. The ORR properties of the commercial Pt/C nanocatalysts. (a) ORR polarization curve for the catalyst at room temperature in O_2-saturated 0.1 M aqueous $HClO_4$ solution at a sweep rate of 10 mV s^{-1} and rotation speed of 1600 rpm. (b) Cyclic voltammetry curve of the catalyst recorded at room temperature in N_2-purged 0.1 M aqueous $HClO_4$ solution with a sweeping rate of 50 mV s^{-1}.

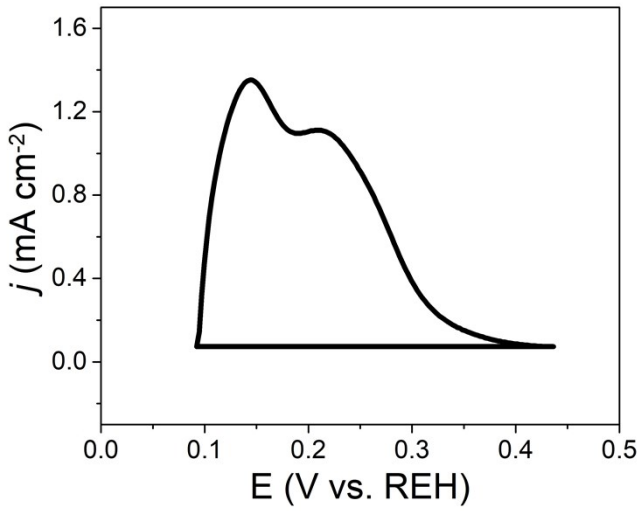

Fig. S10. Blow-ups of the H_{upd} desorption peak in the potential region from 0.08 to 0.44 V. The specific electrochemical active surface area (ECSA) of commercial Pt/C nanocatalyst is derived from the charges responsible for the H_{upd} desorption between 0.04 and 0.44 V.

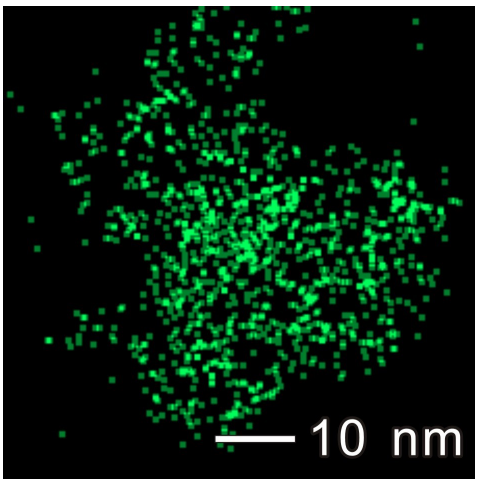

Fig. S11. The corresponding energy-dispersive X-ray spectroscopy mapping of Pd atoms for Fig. 3b.

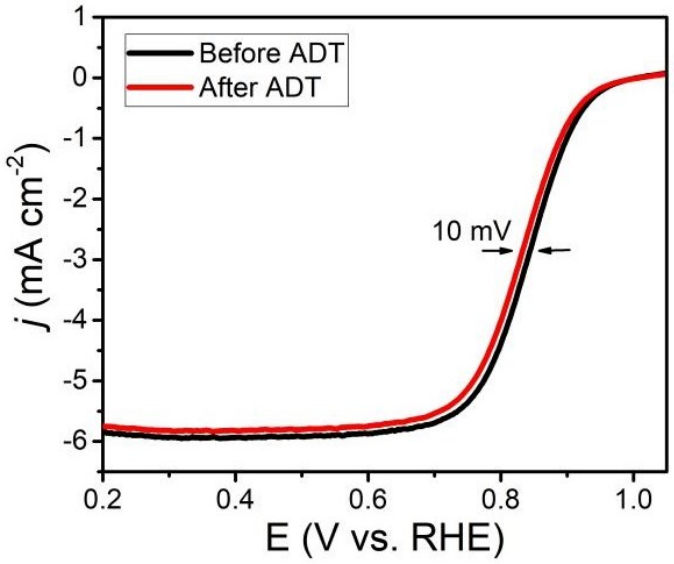

Fig. S12. The ORR polarization curves of Pd nanonetwork before and after accelerated durability test.

Table S1. Specific ECSAs of the commercial Pd/C and Pd nanonetworks derived from the charges responsible for the CO desorption.

Catalysts	ECSA (m^2 $g_{Pd/Pt}^{-1}$)
Commercial Pd/C	33.8
Pd nanonetworks	18.6
Commercial Pt/C	61.3

Table S2. ORR performances of the commercail Pd/C catalyst and Pd nanonetworks at 0.85 V and 0.9 V vs reversible hydrogen electrode (RHE). The mass and specific activities of the catalysts given as kinetic current density (j_k) were normalized to the Pd mass and ECSA, respectively.

Catalysts	$J_{k,mass}$ (A $mg_{Pd/Pt}^{-1}$)	$J_{k,specific}$ (mA cm^{-2})	E (V vs. RHE)
Commercial Pd/C	0.038	0.204	0.85
	0.007	0.038	0.9
Pd nanonetworks	0.152	0.449	0.85
	0.037	0.109	0.9
Commercial Pt/C	0.396	0.640	0.85
	0.109	0.178	0.9