Supporting Information

Sophisticated Construction of Binary PdPb Alloy Nanocubes as Robust Electrocatalysts toward Ethylene Glycol and Glycerol Oxidation

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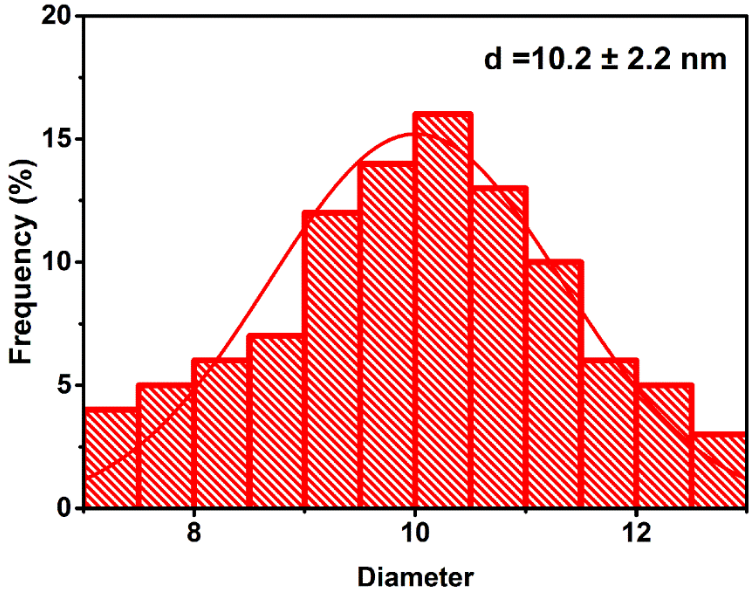

Figure S1. Size distribution of Pd_2Pb NCs.

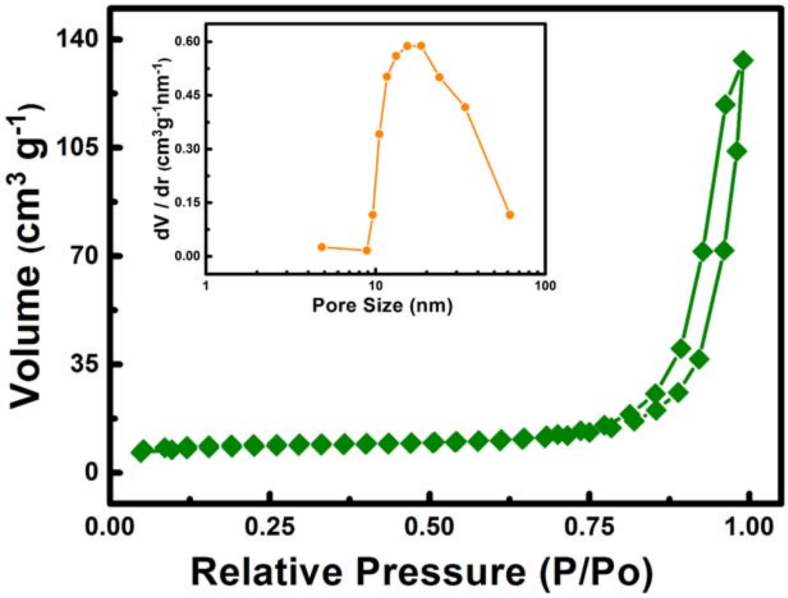

Figure S2. Typical N_2 adsorption–desorption isotherms of the Pd_2Pb NCs, and the inset shows the pore-size distribution curve.

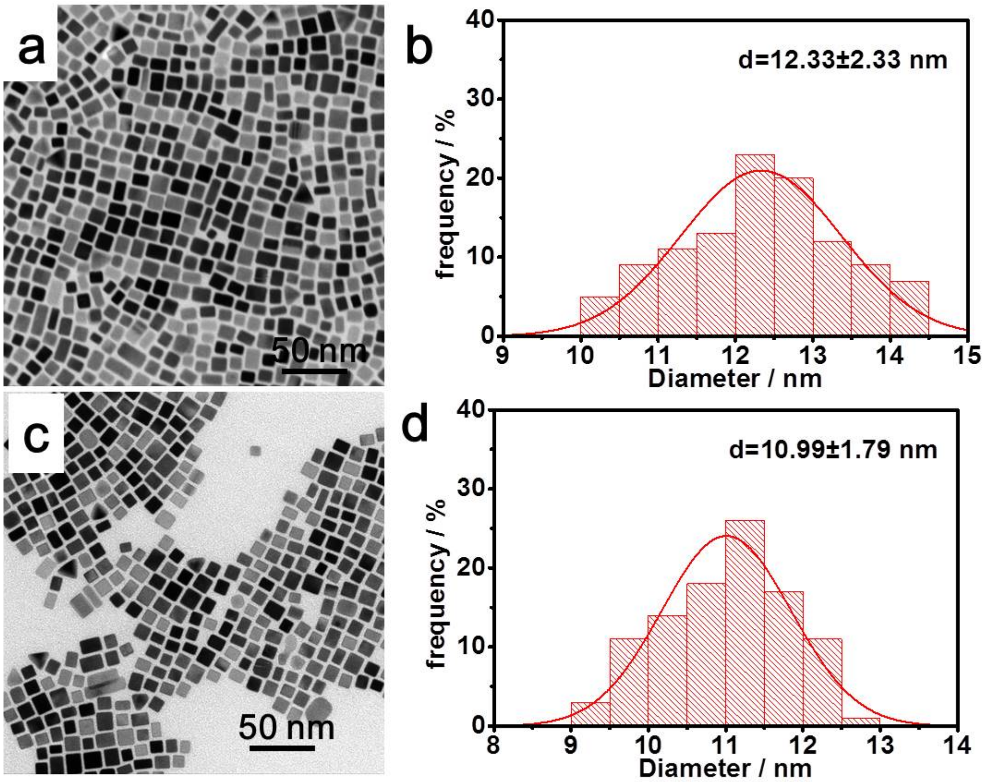

Figure S3. TEM images (a and c) and size distributions (b and d) of Pd_3Pb NCs (a and b) and Pd_4Pb NCs (c and d).

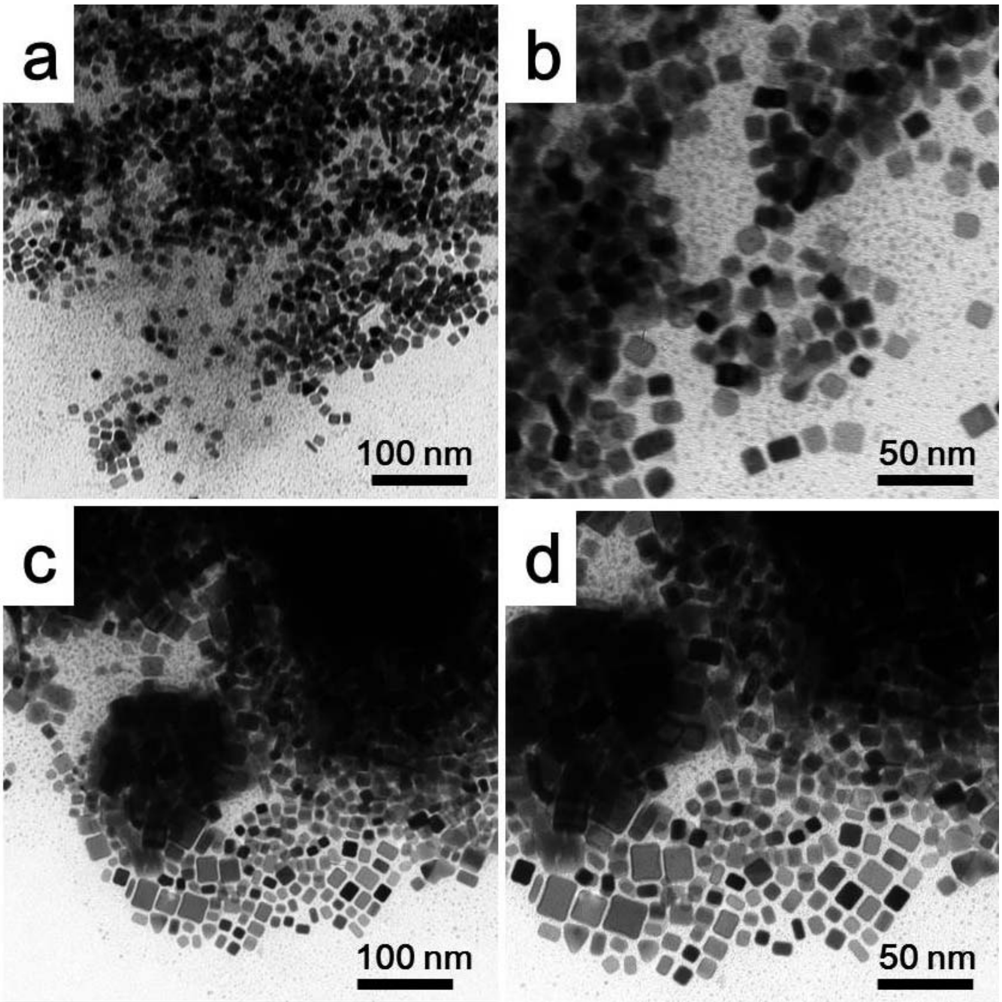

Figure S4. Additional TEM images of $Pd_{1.5}Pb$ NCs (a and b), and PdPb NCs (c and d).

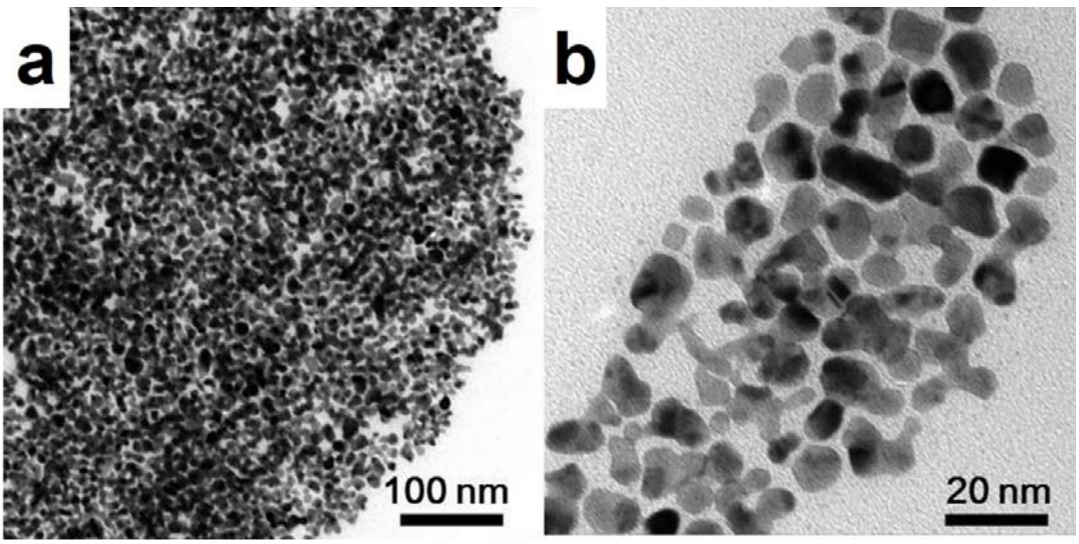

Figure S5. LR-TEM (a) and HR-TEM (b) images with different of PdPb nanocrystals with prepared in the same condition while changing the $PbAc_2$ with $PbCl_2$.

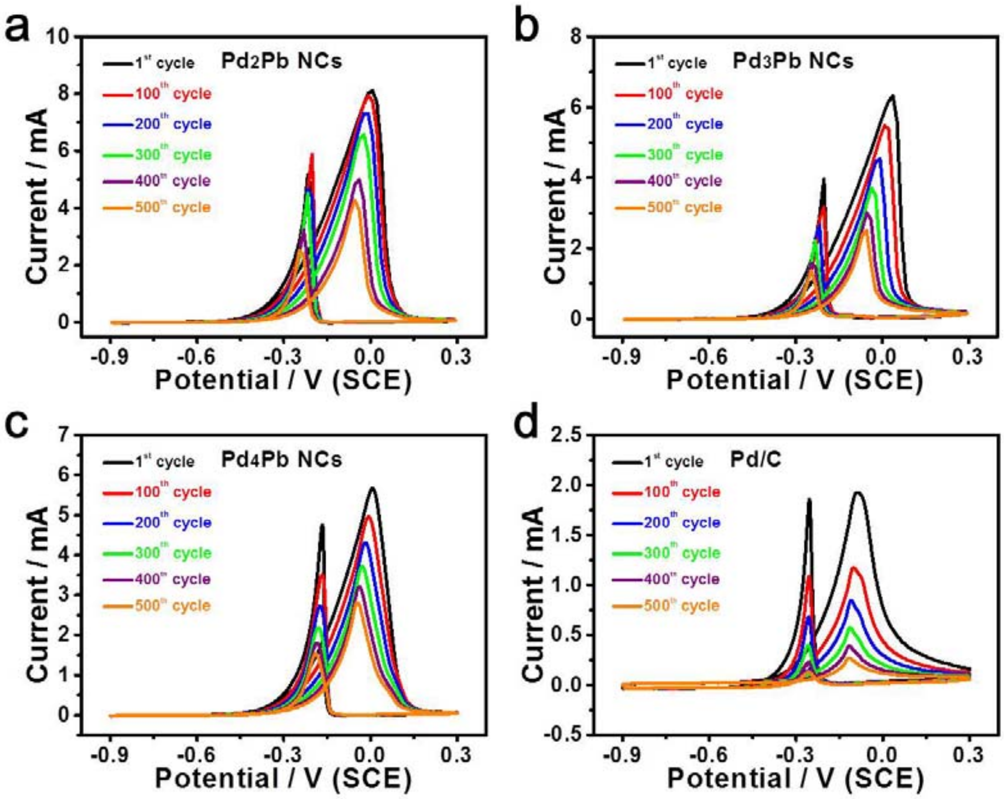

Figure S6. CVs (1st, 200th, 300th, 400th and 500th cycle) of (a) Pd_2Pb NCs, (b) Pd_3Pb NCs, (c) Pd_4Pb NCs and (d) commercial Pd/C for EGOR, respectively. The CVs were operated in the solution of 1 M KOH and 1 M EG at the scan rate of 50 mV s^{-1}.

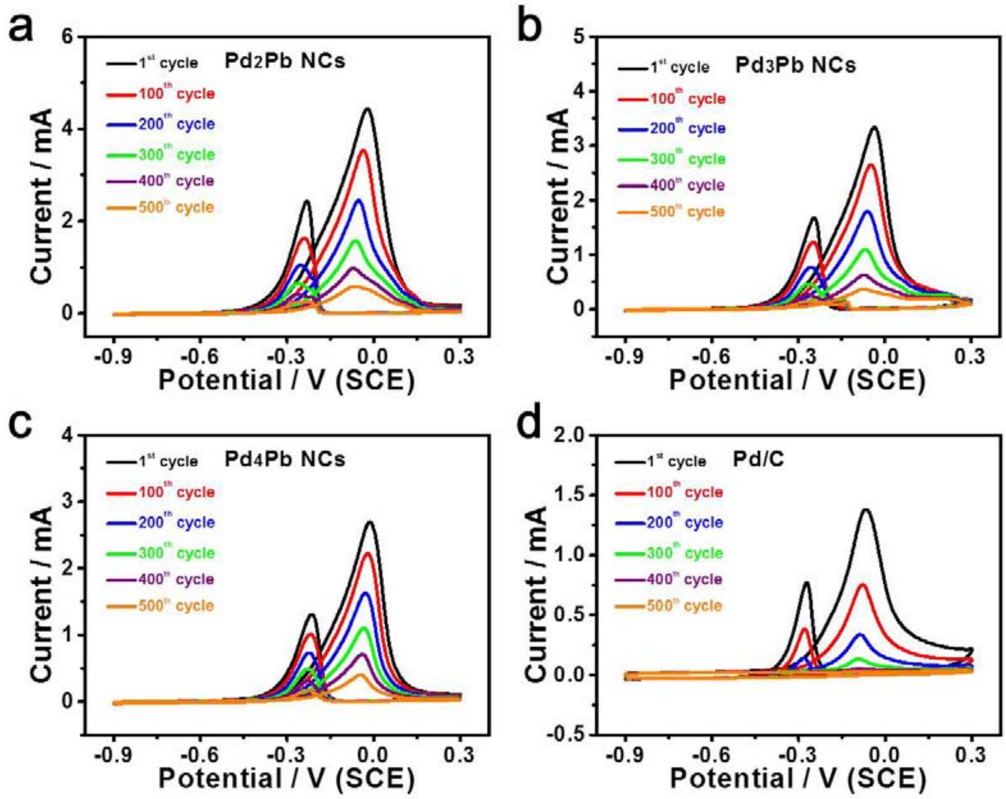

Figure S7. CVs (1st, 100th, 200th, 300th, 400th and 500th cycle) of (a) Pd_2Pb NCs, (b) Pd_3Pb NCs, (c) Pd_4Pb NCs and (d) commercial Pd/C for GOR, respectively. The CVs were operated in the solution of 1 M KOH and 1 M glycerol at the scan rate of 50 mV s^{-1}.

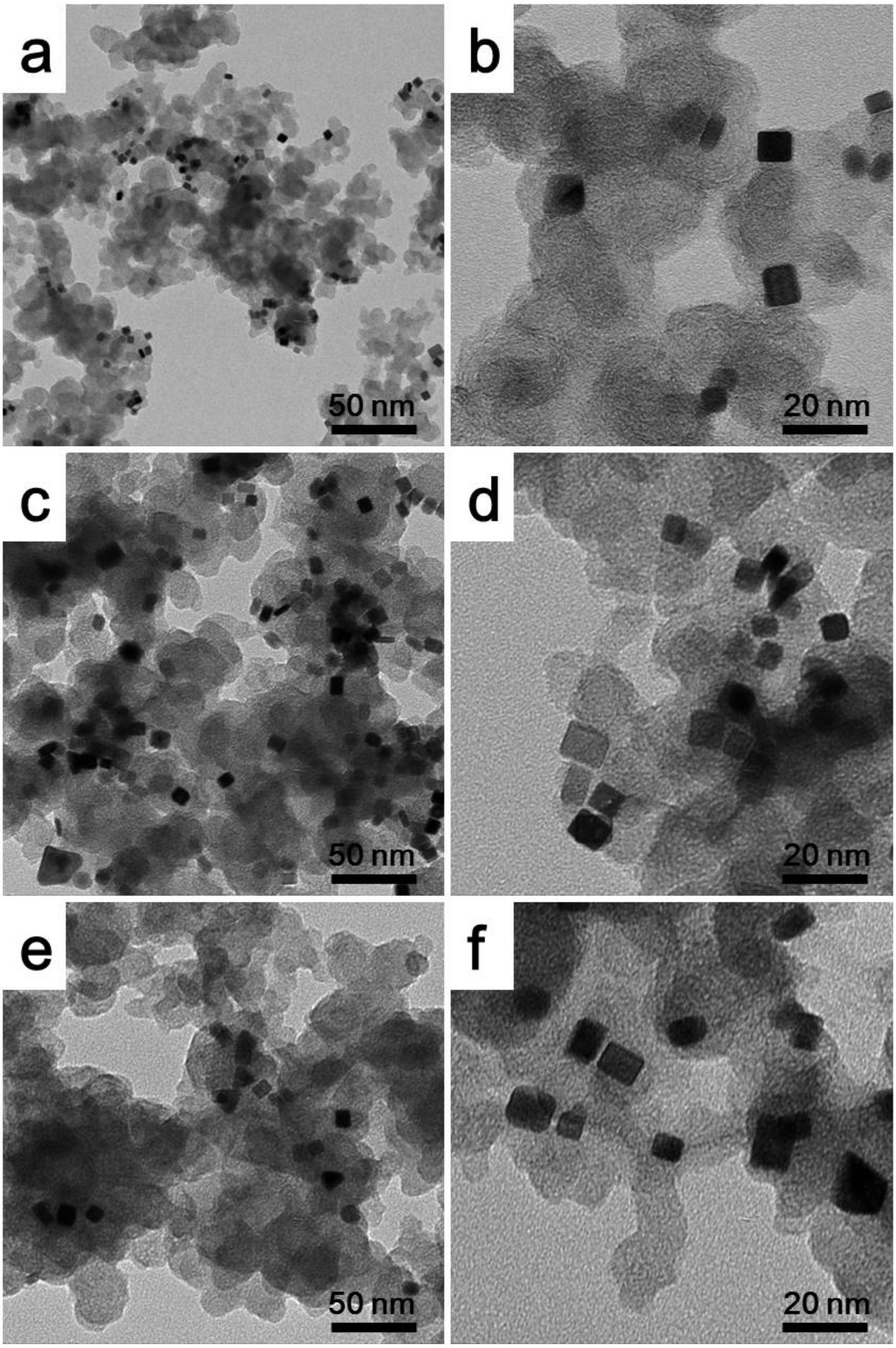

Figure S8. Representative TEM images of (a and b) Pd_2Pb NCs, (c and d) Pd_3Pb NCs, and (e and f) Pd_4Pb NCs catalysts before electrochemical durability test.

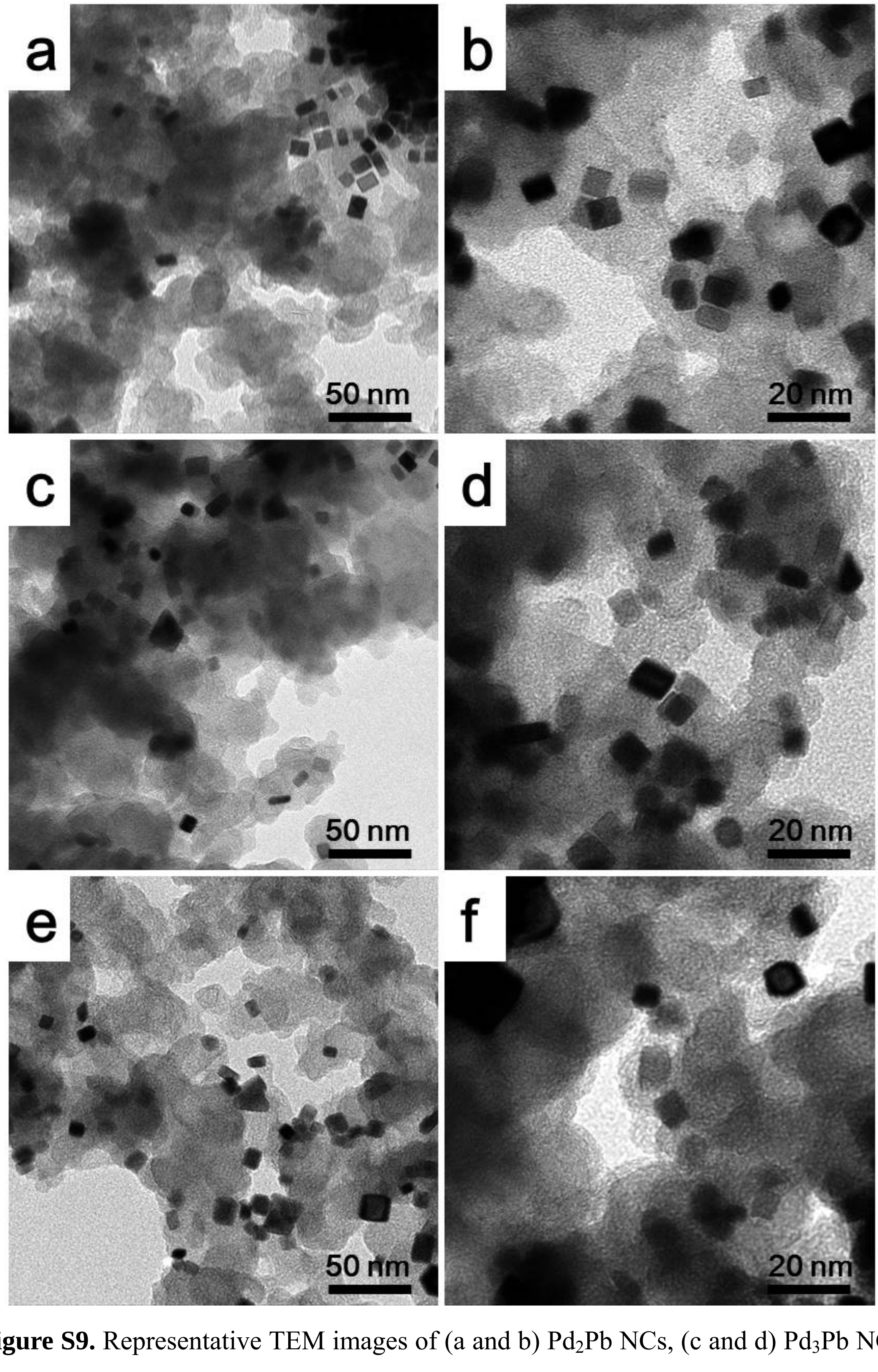

Figure S9. Representative TEM images of (a and b) Pd_2Pb NCs, (c and d) Pd_3Pb NCs, and (e and f) Pd_4Pb NCs catalysts after electrochemical durability test.

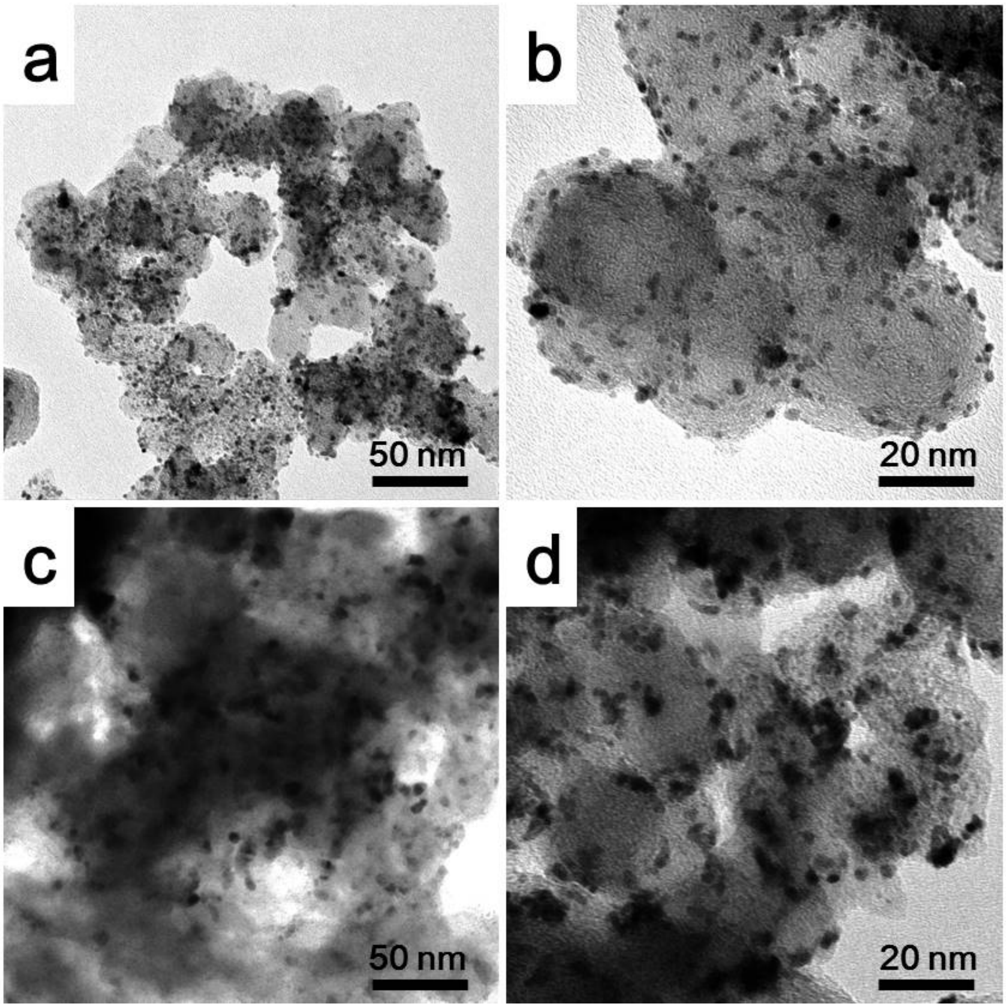

Figure S10. TEM images of Pd/C (a and b) before and (c and d) after 500 cycles in 1 M KOH containing 1 M glycerol at 50 mV s^{-1}.

Table S1. EGOR performances of Pd_2Pb NCs and various Pd-based electrocatalysts from published works

Catalysts	Peaks currents from CV curves		Electrolyte	References
	J_m (A/mg)	J_s (mA/cm^2)		
Pd_2Pb NCs	2.22	9.20	1.0 M KOH + 1.0 M EG	This work
Pd-Ag/C	0.96		1.0 M KOH + 0.5 M EG	Int. J. Hydrogen Energy **2015**, *40*, 2225-2230
AuPd NCs	0.69	4.72	0.5 M KOH + 0.5 M EG	J. Colloid Interface Sci. 2018, 509, 10-17.
$Pd_{90}Cu_{10}$	3.30		1.0 M KOH + 1.0 M EG	New J. Chem 2017, 41, 13812-13822
PdCu/C		~ 2.50	0.3 M KOH + 0.3 M EG	Procedia Chem. **2014**, *12*, 19-26
Pd–Fe_2CoO_x/C	0.48		0.5 M KOH + 0.5 M EG	Int. J. Hydrogen Energy **2015**, *40*, 10041-10048.
Pd/Ni	0.10		1.0 M KOH + 1.0 M EG	Open Catal J. 2010, 3, 70-78
PdNi/C	0.23		1.0 M KOH + 1.0 M EG	J. Mater. Chem. A **2015**, *3*, 15920-15926
Pd_1Cu_1 nanosphere	3.58		1.0 M KOH + 1.0 M EG	Electrochim. Acta **2018**, *261*, 521-529.
PdCuBi nanoparticles	0.17		1 M KOH + 0.5 M EG	J. Power Sources. **2014**, *249*, 9-12
Au-Pd@Pd	0.54		0.5 M KOH + 0.5 M EG	Int. J. Hydrogen Energy **2016**, *44*, 2547-2553
PdAg NFs	3.60	9.01	1.0 M KOH + 1.0 M EG	J. Electroanal. Chem. **2017**, *806*, 1-7
PdAg nanoparticle	0.17		0.1 M KOH + 1.0 M EG	Int. J. Hydrogen Energy **2015**, *40*, 2225-2230
PdRu NCs	1.17	3.35	1.0 M KOH + 1.0 M EG	Appl. Surf. Sci. ***2018***, *427*, 83-89.
Au@Pd	4.02	8.87	1.0 M KOH + 1.0 M EG	J. Alloys Compond. ***2017***, *723*, 36-42

Table S2. GOR performances of Pd_2Pb NCs and various Pd-based electroatalysts from published works

Catalysts	Peaks currents from CV curves		Electrolyte	References
	J_m (A/mg)	J_s (mA/cm^2)		
$Pt_{52}Cu_{48}$ HTNCs	3.20	6.20	1.0 M KOH + 1.0 M Glycerol	This work
$Pd_{63}Ag_{37}$ nanocorals	1.60	6.07	1.0 M KOH + 0.5 M Glycerol	J. Mater. Chem. A **2015**, *3*, 15920-15926
AuPd NCs	4.08	0.59	0.5 M KOH + 0.5 M Glycerol	J. Colloid Interface Sci. **2018**, 509, 10-17.
$Pd_xAg_{(100-x)}$/C	~ 0.25		0.1 M KOH + 0.1 M Glycerol	Electrocatal. **2013**, 4，167-178
PdCu/C		~ 1.40	0.3 M KOH + 0.3 M Glycerol	Procedia Chem. **2014**, *12*, 19-26
PdAu/CB		7.23	1.0 M KOH + 0.5 M Glycerol	J. Power Sources **2015**, 297, 149-157
Pd-CNx/G	1.10		0.5 M KOH + 0.5 M Glycerol	ACS Catal. **2015**, 5, 3174-3180
Pd_5Ru-PEDOT/C		4.30	1 M KOH + 0.5 M Glycerol	Electrochim. Acta **2015**, *180*, 339-352
$Pd_{50}Ni_{50}$/C	0.19		0.1 M KOH + 0.1 M Glycerol	Electrocatal. **2013**, 4，167-178
Pd_3Sn/phen-C	0.18		0.1 M KOH + 0.5 M Glycerol	Int. J. Hydrogen Energy **2016**, *41*, 1272-14280
Pd-NiOx-P/C	0.368		0.1 M KOH + 0.5 M Glycerol	Chem. Eng. J. **2017**, 38, 419-427
PtAg nanotubes	0.21	6.0	0.5 M KOH + 0.5 M Glycerol	Electrochem. Commun. **2014**,46,36-39