

Supplementary Materials

Polydopamine functionalized multi-walled carbon nanotubes supported palladium-lead bimetallic alloy nanoparticles as highly efficient and robust catalyst for ethanol oxidation

Honglei Yang*, Siyi Kang, Hai Zou, Jun Jin, Jiantai Ma and Shuwen Li*

State Key Laboratory of Applied Organic Chemistry, Gansu Provincial Engineering
Laboratory for Chemical Catalysis, College of Chemistry and Chemical Engineering,
Lanzhou University, Lanzhou 730000, P. R. China

* Corresponding authors. Tel./fax: +86 931 8912577.

E-mail addresses: yanghl@lzu.edu.cn (Honglei Yang),

lishw@lzu.edu.cn (Shuwen Li).

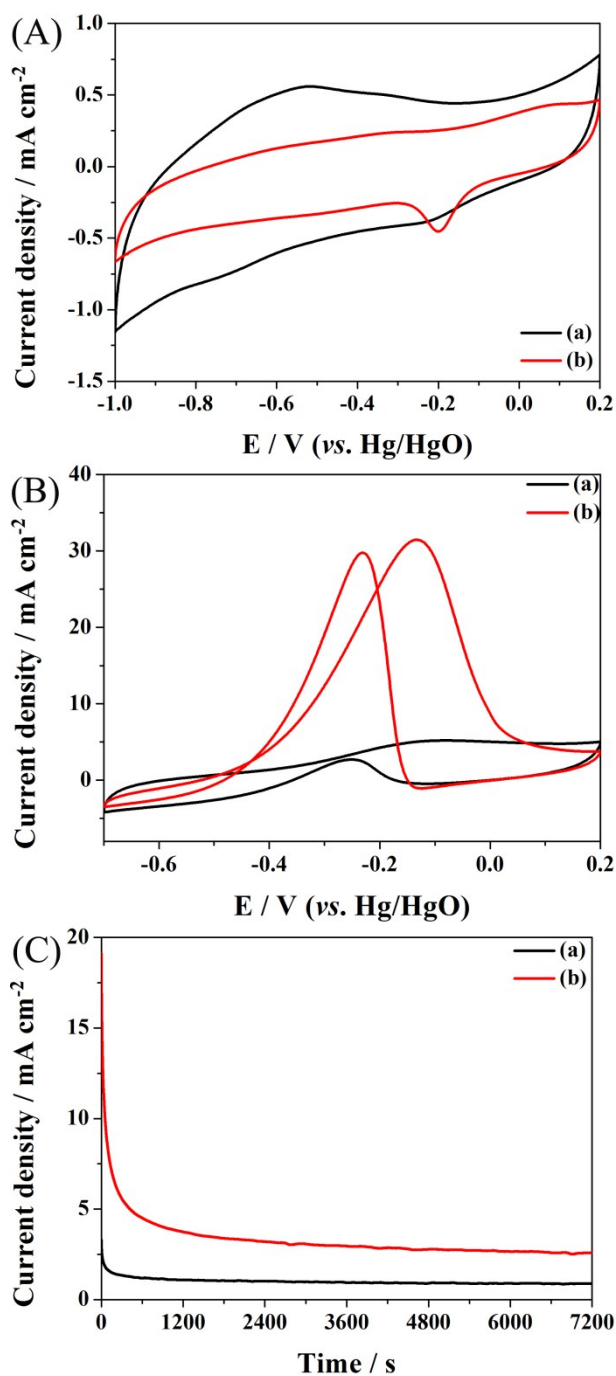


Fig. S1 CV curves of (a) Pd/PDA and (b) Pd₃Pb/MWCNTs in 1 M KOH solution (A), and in nitrogen-saturated 1 M KOH + 1 M C₂H₅OH solution (B) at a scan rate of 50 mV s⁻¹. (C) Chronoamperometric curves of (a) Pd/PDA and (b) Pd₃Pb/MWCNTs for ethanol electrooxidation at -0.20 V in nitrogen-saturated 1 M KOH + 1 M C₂H₅OH solution.

Table S1 Comparison of electrocatalytic activity with different catalysts.

Catalysts	ECSA (m ² g ⁻¹)	E_{onset} (V vs. Hg/HgO)	I_f (mA mg ⁻¹)	I_s (mA mg ⁻¹)
Pd/PDA	4.7	-0.38	5.2	1.0
Pd ₃ Pb/MWCNTs	10.6	-0.49	31.9	2.6

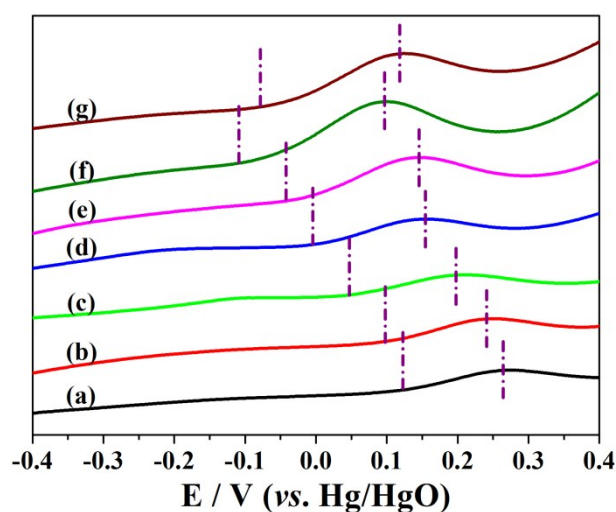


Fig. S2 CO stripping curves in 1 M KOH solution for (a) Pd/PDA, (b) Pd/MWCNTs, (c) Pd/PDA-MWCNTs, (d) Pd₃Pb/MWCNTs, (e) Pd₅Pb/PDA-MWCNTs, (f) Pd₃Pb/PDA-MWCNTs and (g) PdPb/PDA-MWCNTs.

Table S2 Parameters obtained from CO stripping curves

Catalysts	$E^{\text{co}}_{\text{onset}}$ (V vs. Hg/HgO)	E^{co}_{f} (V vs. Hg/HgO)
Pd/PDA	0.123	0.264
Pd/MWCNTs	0.098	0.241
Pd/PDA-MWCNTs	0.047	0.197
Pd ₃ Pd/MWCNTs	-0.006	0.154
Pd ₅ Pd/PDA-MWCNTs	-0.042	0.147
Pd ₃ Pd/PDA-MWCNTs	-0.109	0.101
PdPb/PDA-MWCNTs	-0.078	0.117

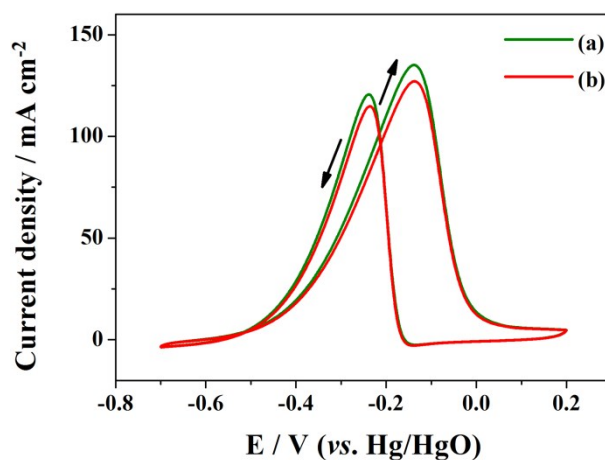


Fig. S3. (A) CV scans of Pd₃Pb/PDA-MWCNTs before (a) and after 500 cycles (b) in nitrogen-saturated 1 M KOH + 1 M C₂H₅OH solution at a scan rate of 50 mV s⁻¹.

