Electronic Supplementary Information (ESI)

Oxygen reduction activity of Pd-Mn_3O_4 nanoparticles and performance enhancement by voltammetrically accelerated degradation

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Supporting information table of contents:

Fig. S1 Atomic ratio between Pd and Mn at the surface of the prepared nanoparticles calculated from XPS analysis.

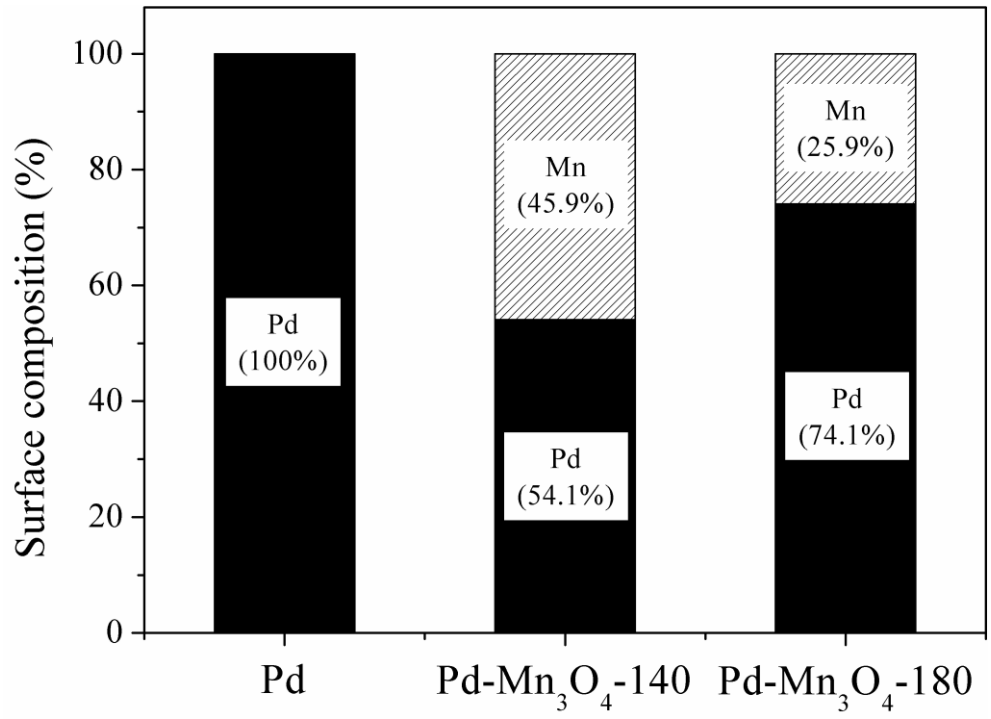

Fig. S2 XPS-Pd_{3d} (left) and -Mn_{2p} (right) results of the prepared nanoparticles; (a) Pd, (b) Pd-Mn_3O_4-140 and (c) Pd-Mn_3O_4-180. The peaks in Pd_{3d} are assigned to Pd^o, PdO and PdO_2.

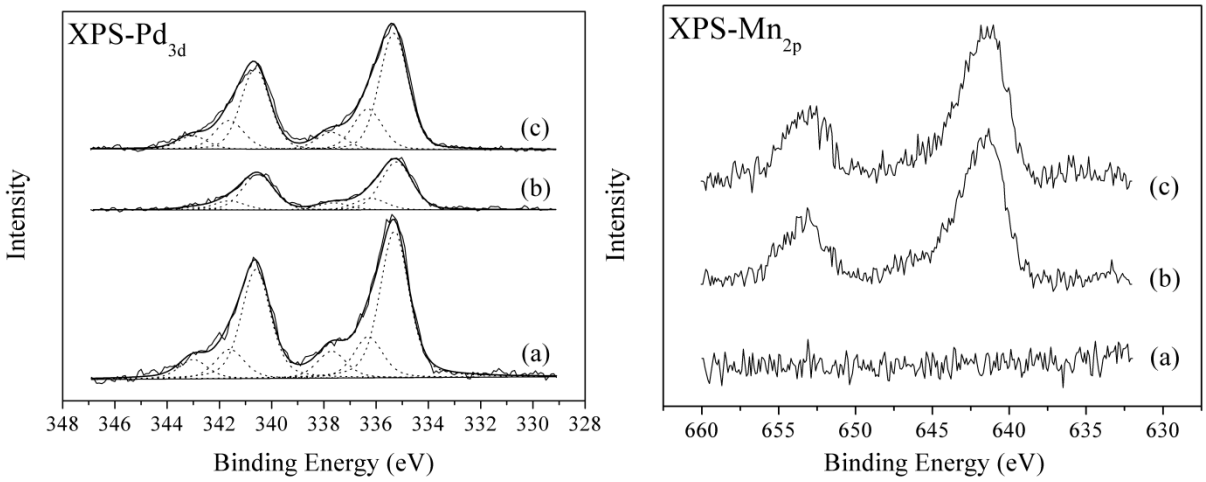

Fig. S3 Oxygen reduction reactivities of prepared catalysts in the (i) absence and (ii) presence of methanol in oxygen saturated 1M $HClO_4$ for (a) Pd/C, (b) Pd-Mn_3O_4-140/C, (c) Pd-Mn_3O_4-180/C and (d) Pt/C.

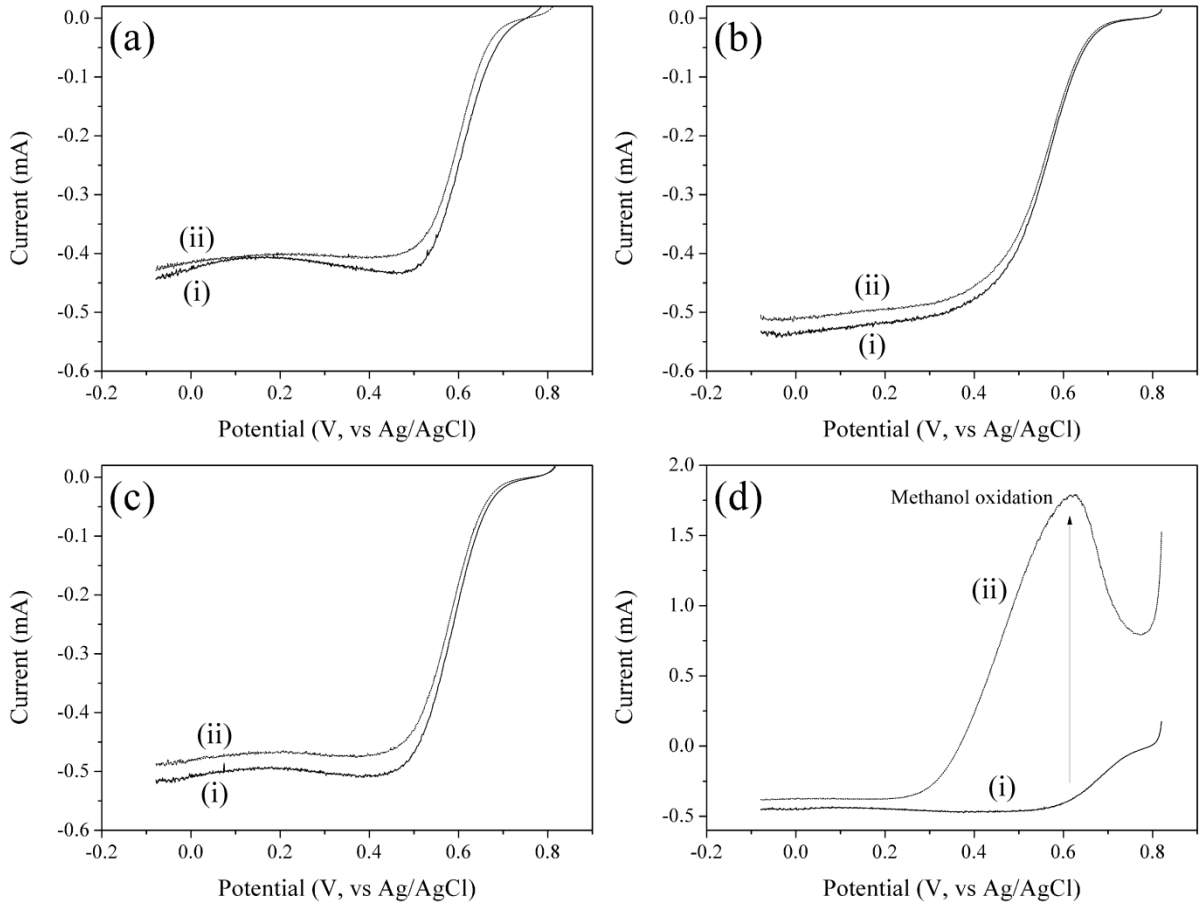

Fig. S4 Comparison of ADT results at (a) the 1st cycle and (b) the 100th cycles for the prepared catalysts; (I) Pd/C, (II) Pd-Mn_3O_4-140/C and (III) Pd-Mn_3O_4-180/C. The graph inserted in the right-hand corner in each Fig. shows the magnified results from 0.35 to 0.65 V (vs Ag/AgCl).

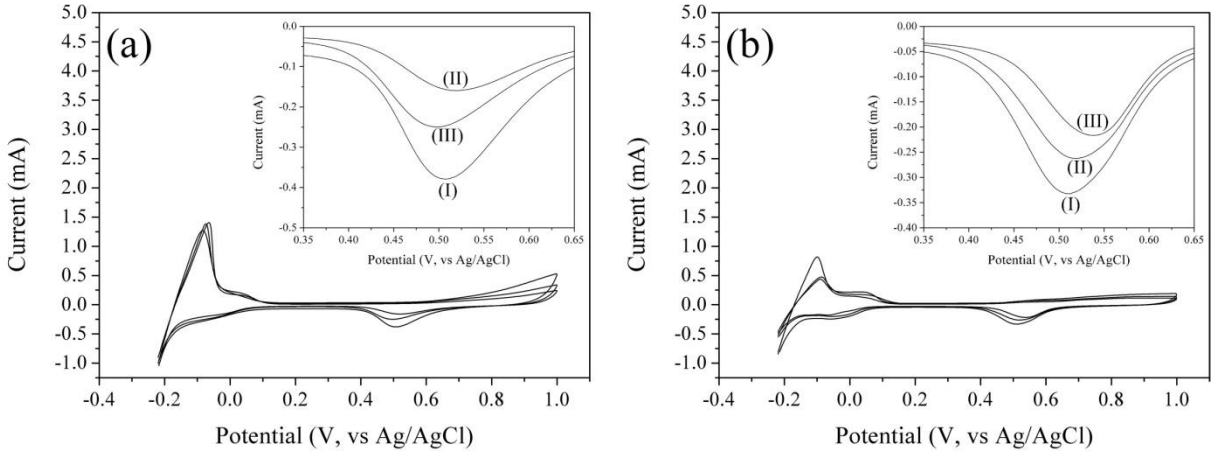

Fig. S5 ADT results at the 1st, 50th and 100th cycles of (a) Pd/C, (b) Pd-Mn_3O_4-140/C and (c) Pd-Mn_3O_4-180/C. The graph inserted in the right-hand corner in each Fig. shows the magnified results from 0.35 to 0.65 V (vs Ag/AgCl).

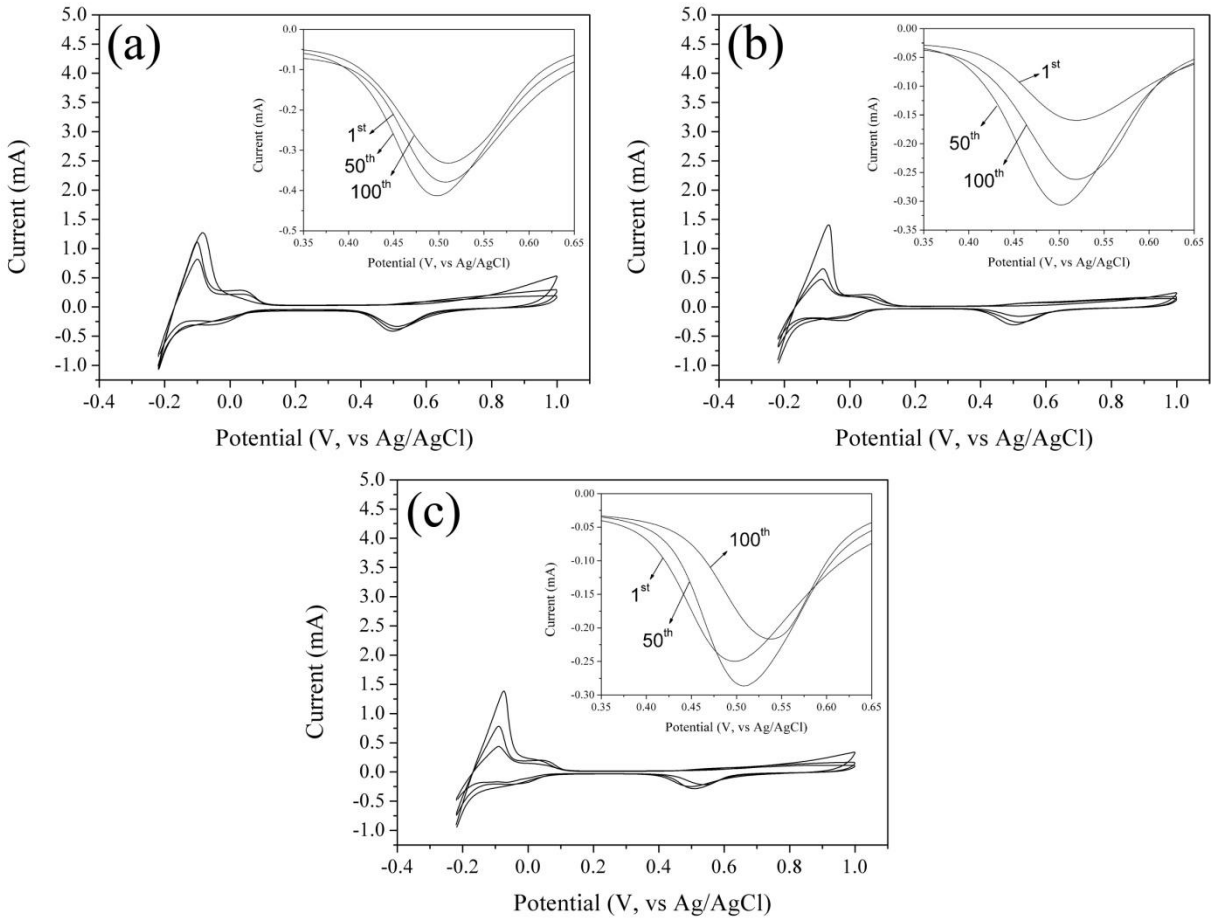

Fig. S6 Schematic ADT-modification process on the surface of Pd-Mn_3O_4-140 nanoparticles. Red and yellow spheres indicate Mn_3O_4 and Pd atoms, respectively, which construct Pd-Mn_3O_4-140 nanoparticles.