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One-step Molten Salt Synthesis of Carbon-Supported Pt-Rare Earth Metal Nanoalloy Catalysts for Oxygen Reduction Reaction

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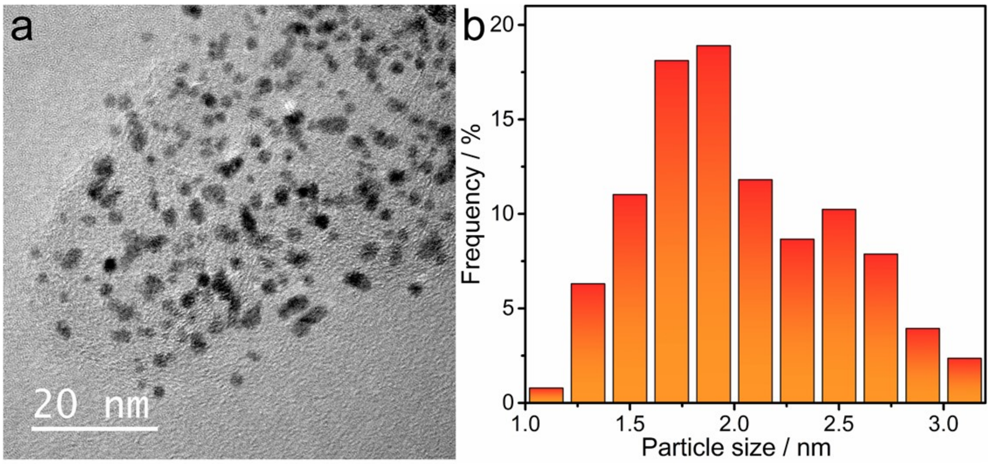

Figure. S1 (a) Typical TEM image of commercial Pt/C catalyst and its corresponding particle size distribution histogram (b).

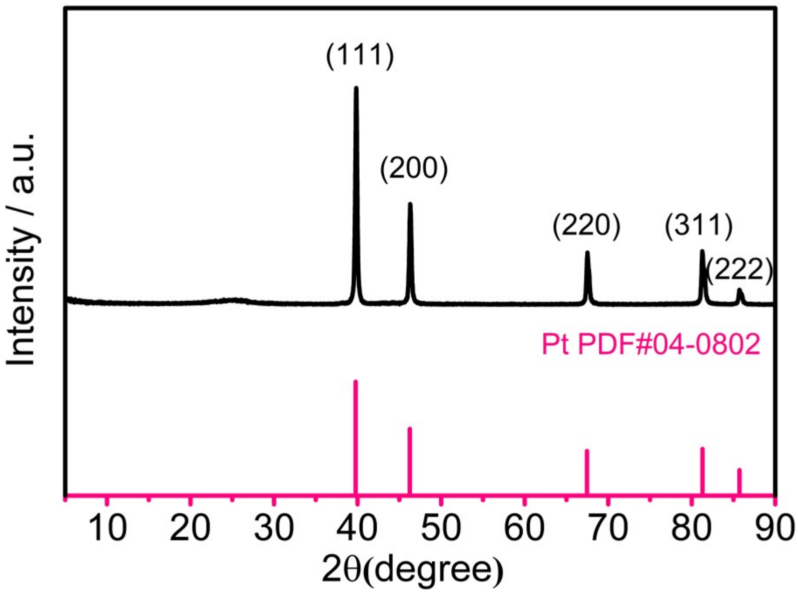

Figure. S2 XRD patterns of the materials synthesized without LiCl

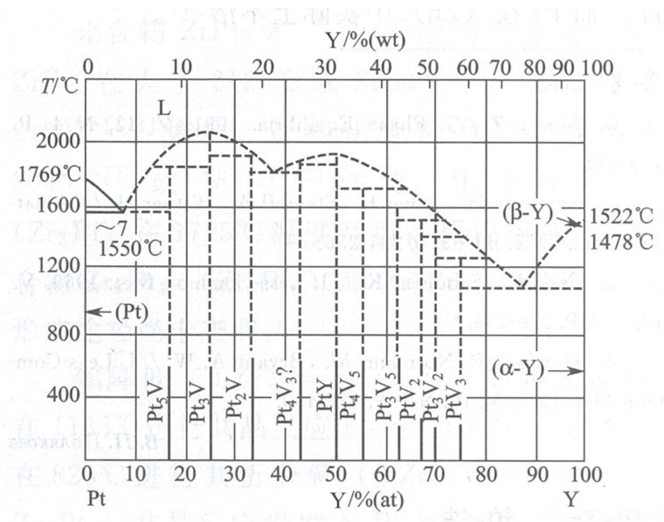

Figure. S3 Phase diagrams of Pt-Y alloy.[1]

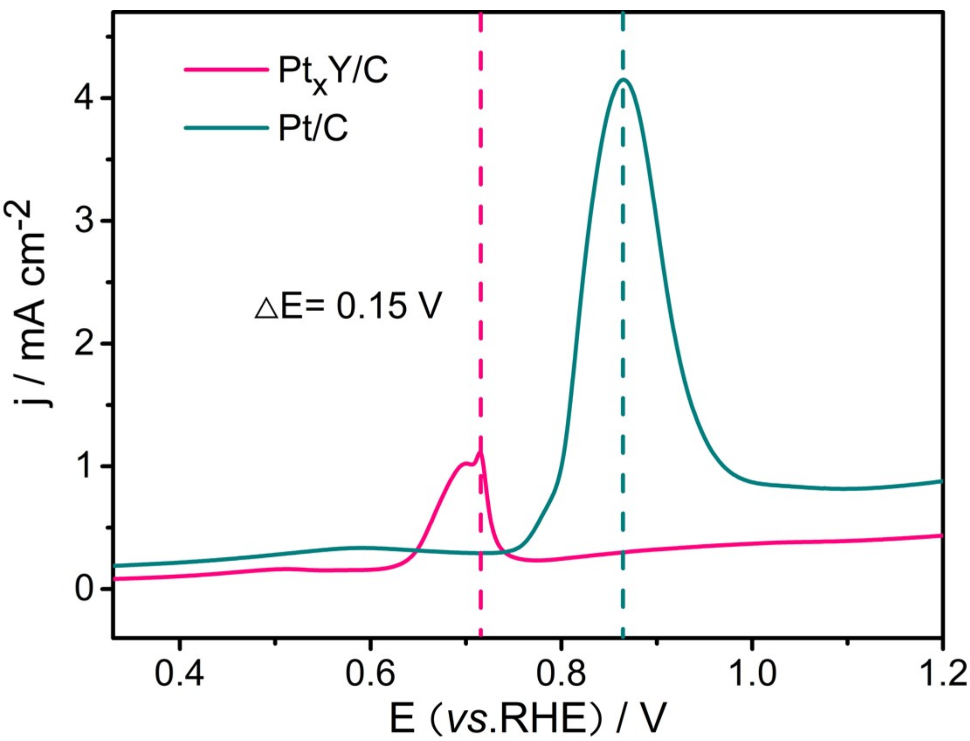

Figure. S4 CO-stripping CO stripping (first sweep) on Pt_xY/C and Pt/C in 0.1 M $HClO_4$

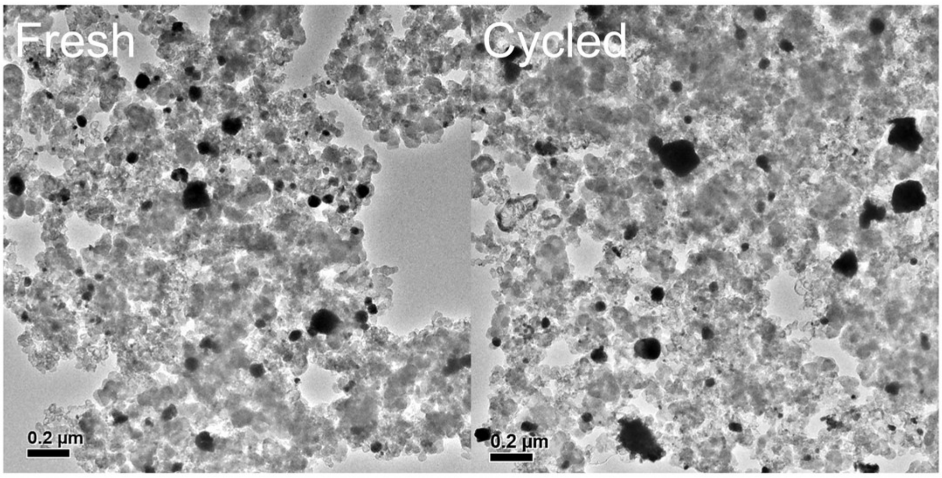

Figure. S5 Representative TEM images of fresh and cycled Pt_xY/C synthesized.

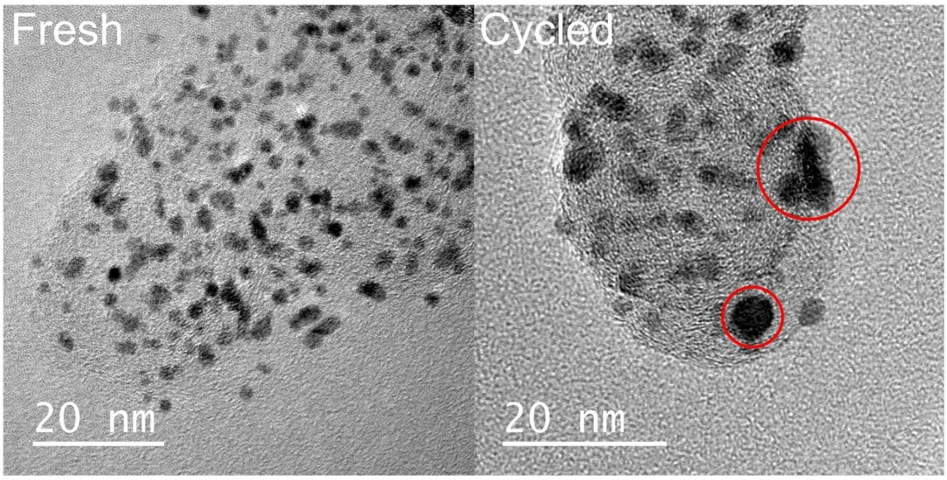

Figure. S6 Representative TEM images of fresh and cycled commercial Pt/C catalyst.

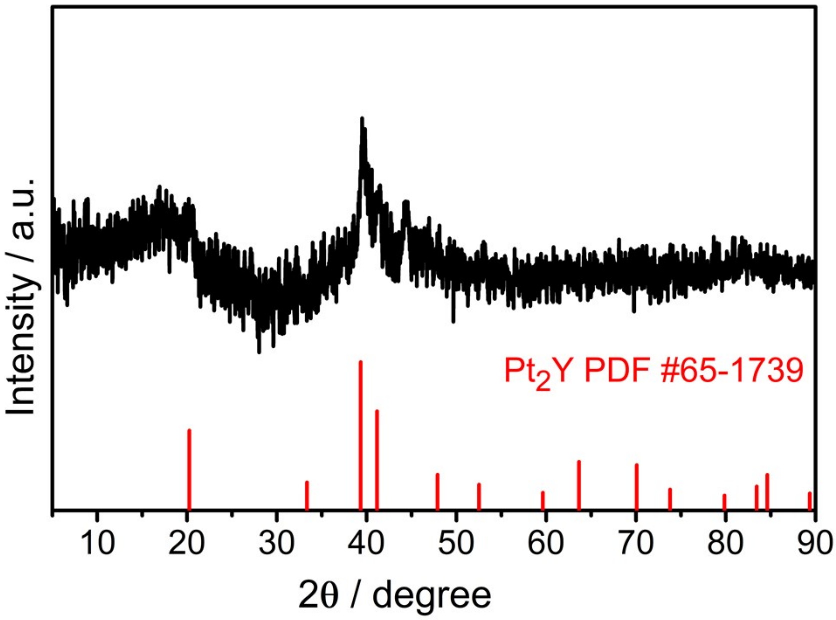

Figure. S7 XRD patterns of the Pt_xY/C after ADT.

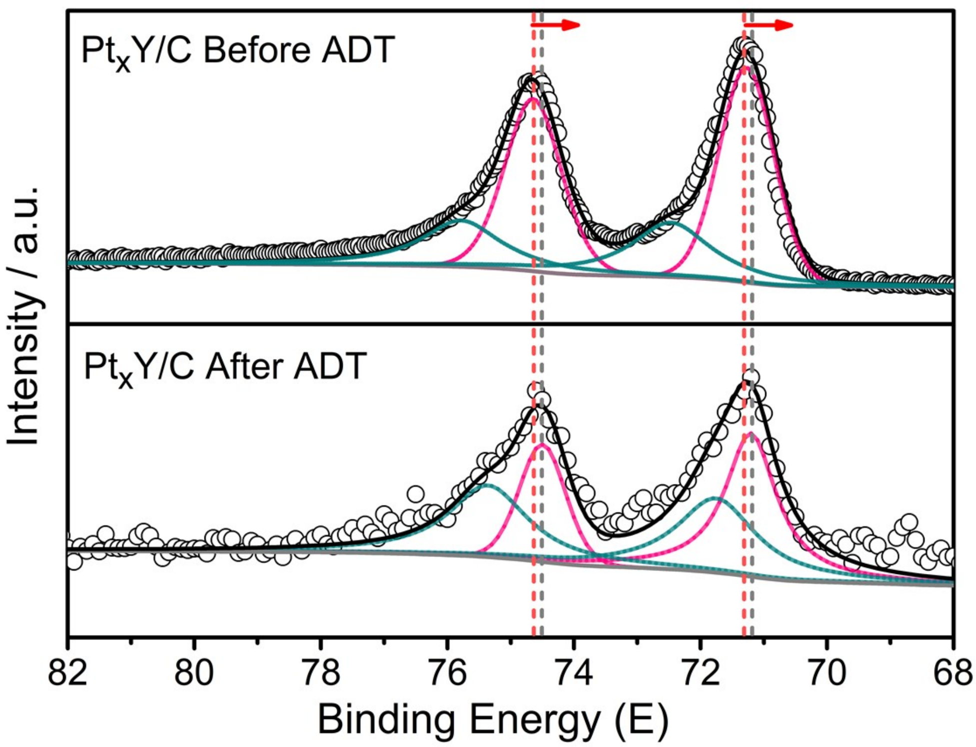

Figure. S8 XPS spectra of (a) Pt 4f core levels for the Pt_xY/C prepared and (b) Y 3d core levels for the Pt_xY/C prepared.

Table S1 Characteristic datas for Pt_xY or Pt_xY/C catalysts, including synthesis method， the shift of half-wave potential， mass activity and specific activity at 0.9 V (*vs*. RHE) and the accurate XRD demonstration.

Source	Synthesis Method	The shift of half-wave potential when compared with Pt/C.	Mass activity & Specific activity at 0.9 V (*vs*.RHE)	LSV scan rate	accurate XRD demonstration
This report	Molten salt method	25 mV	MA: 0.26 A/mg_{Pt} while Pt/C is 0.12 A/mg_{Pt}. SA: 1.52 mA/cm_{Pt}^2 while Pt/C is 0.22 mA/cm_{Pt}^2.	10 mV/s	Pt_2Y、Pt_3Y
Brandiele et al.[2]	Laser ablation synthesis	29 mV	MA: 0.483±0.009 A/mg_{Pt} while Pt/C is 0.211 ± 0.008 A/mg_{Pt}. SA: 0.562 ± 0.031 $mA/cm^2{}_{Pt}$ while Pt/C is 0.562 ± 0.031 $mA/cm^2{}_{Pt}$.	20 mV/s	Pt_2Y、Pt_3Y
Schwammlein et al.[3]	Hydrogen reduction method	-20 mV	MA: 0.106±0.035 A/mg_{Pt} while Pt/C is 0.270 ± 0.005 A/mg_{Pt}. SA: 0.740 ± 0.170 $mA/cm^2{}_{Pt}$ while Pt/C is 0.385 ± 0.040 mA/ $cm^2{}_{Pt}$.	10 mV/s	Pt_2Y、Pt_3Y
Roy et al. [4]	Hydrogen reduction method	10mV	MA: 0.43 A/mg_{Pt} while Pt/C is ~ 0.27 A/mg_{Pt}. SA: 2 $mA/cm^2{}_{Pt}$ while Pt/C is ~ 1 $mA/cm^2{}_{Pt.}$	50 mV/s	Pt_3Y、Pt_5Y (fcc、hex)、Pt_2Y
Yoo et al.[5]	Sputtering technique	98 mV	SA：25.5 $mA/cm^2{}_{Pt}$ while Pt is 1.6 $mA/cm^2{}_{Pt}$.	10 mV/s	Pt_3Y

References

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