

## Supporting Information

Highly branched platinum nanolance assemblies by polyallylamine  
functionalization as superior active, stable, and alcohol-tolerant oxygen  
reduction electrocatalysts

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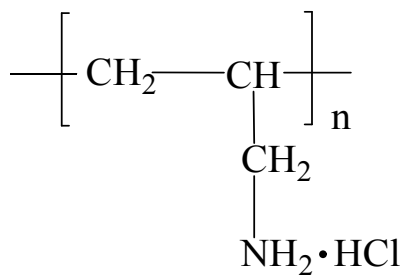
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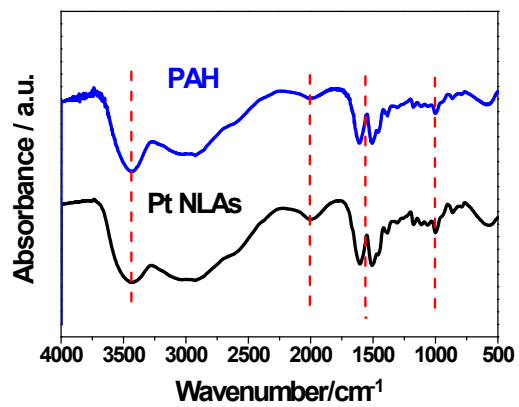
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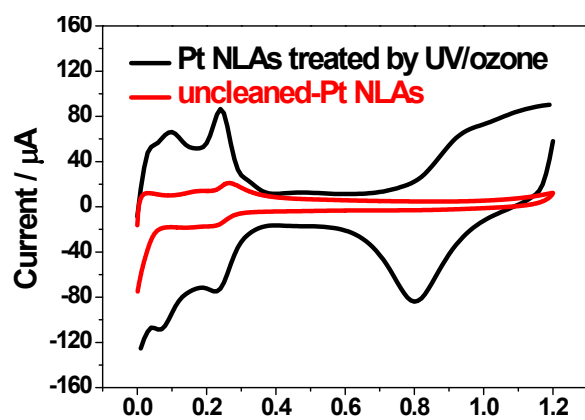
## Experimental Data



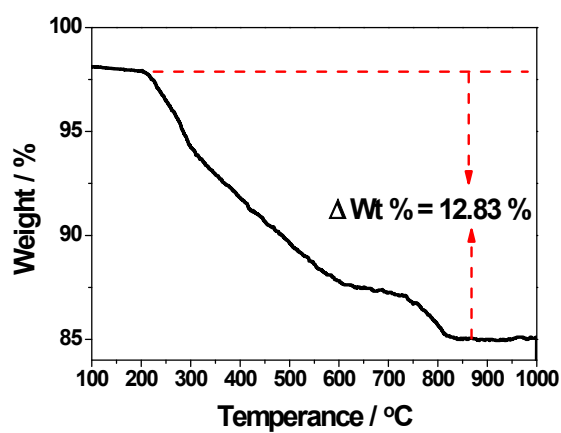
**Scheme S1.** The structure of the polyallylamine hydrochloride (PAH).



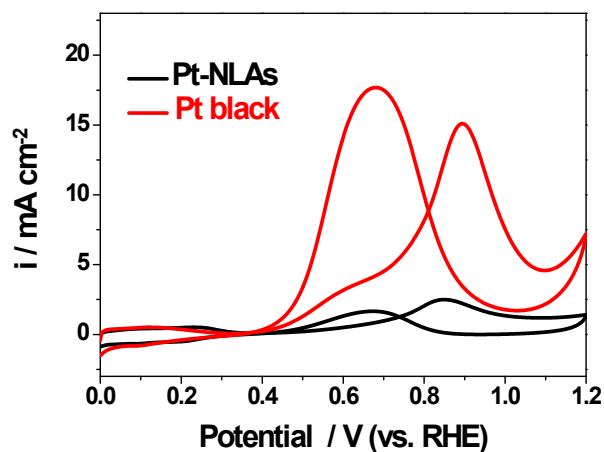
**Figure S1.** FT-IR spectra of the PtNLAs and pure PAH.



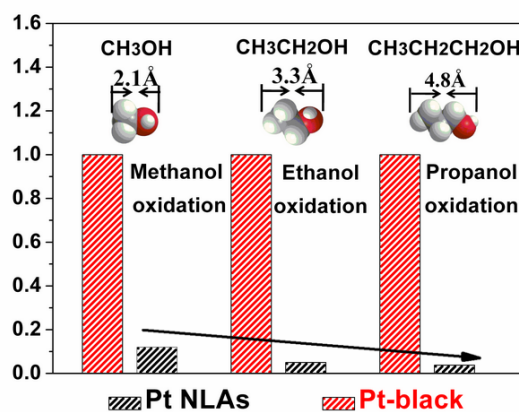
**Figure S2.** CV curves of the Pt NLAs before and after UV/ozone treatment in  $O_2$ -saturated 0.5 M  $H_2SO_4$  solution at a scan rate of  $50 \text{ mV s}^{-1}$ .



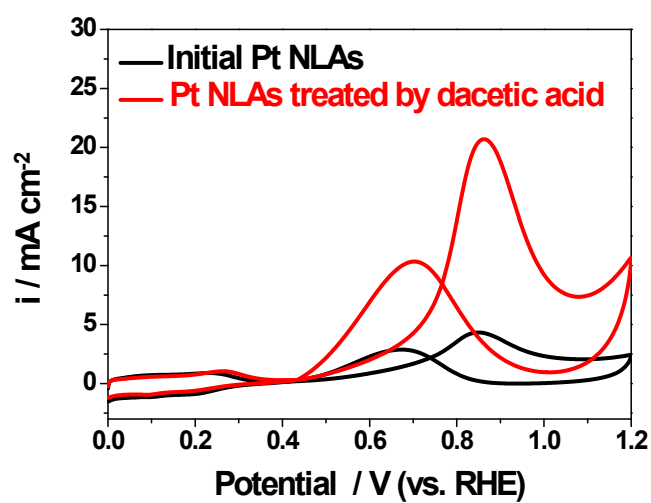
**Figure S3.** TGA curve of the Pt NLAs after UV/ozone treatment at a heating rate of  $10 \text{ }^\circ\text{C min}^{-1}$  under nitrogen atmosphere.



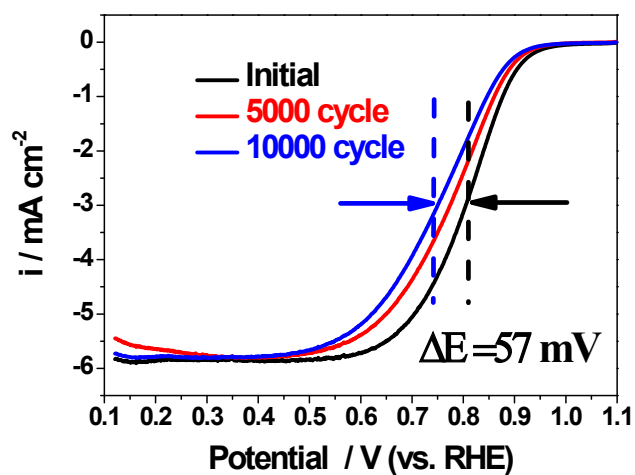
**Figure S4.** CV curves for the commercial Pt black and Pt NLAs in  $N_2$ -saturated 0.5 M  $H_2SO_4$  solutions with 1.0 M methanol at a scan rate of  $50 \text{ mV s}^{-1}$ .



**Figure S5.** The ratios of electrochemically specific peak current densities of methanol, ethanol, and 1-propanol at the PtNLAs (IPtNLAs) to these at the commercial Pt black (IPt black). For convenience, the specific peak current densities of methanol, ethanol, and 1-propanol at the commercial Pt black were normalized to 1. As observed, the value of the IPtNLAs/IPt black decreases with increasing molecule size of alcohol. A smaller value of the IPtNLAs/IPt black implies better alcohol tolerant ability.



**Figure S6.** CVs for the Pt NLAs before and after acetic acid washing in  $N_2$ -saturated  $0.5\text{ M H}_2\text{SO}_4 + 1.0\text{ M}$  methanol solution.



**Figure S7.** ORR polarization curves of commercial Pt black after different numbers of cycles.