Supporting Information

The Enhancement of Oxygen Reduction Reaction Performance of Pt Nanomaterials by 1-Dimensional Structure and Au Alloying

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1. Experimental Section

The typical XAS spectra of various catalysts were obtained in fluorescence mode at the BL01C1 and 17C beamlines at the National Synchrotron Radiation Research Center (NSRRC), Taiwan. A Si monochromator was employed to adequately select the energy with a resolution ΔE/E better than 10^{-4} at the Pt L_{II} -edge (13273 eV) and Pt L_{III} -edge (11564 eV). About 0.01 g of catalysts were dispersed uniformly on the tape and prepared as thin pellets with an appropriate absorption thickness (μx=1.0, where μ is the X-ray attenuation coefficient at the absorption edge and x is the thickness of the sample) to attain a proper edge jump step at the absorption edge region. In order to acquire acceptable quality spectra with good quality, each measurement was repeated at least three times and averaged for successive comparison.

The electrochemical measurements were conducted by a CHI611C potentiostat and a classical electrochemical cell with a three-electrode configuration. The cyclic voltammograms (CV) were obtained from 0.0 to 1.2 V with scan rate of 20 mV s^{-1} under N_2 atmosphere. The electrochemical surface area (ECSA) was calculated by measuring the areas of H desorption between 0.05 and 0.4 V after the deduction of the double-layer region by use of following equation:

$$\mathrm{ECSA} = \frac{Q_H}{0.21} \quad (1)$$

where Q_H depicts the charge for H-desorption (mC cm^{-2}) and 0.21 is the charge required to oxidize a monolayer of H_2 on clean Pt.

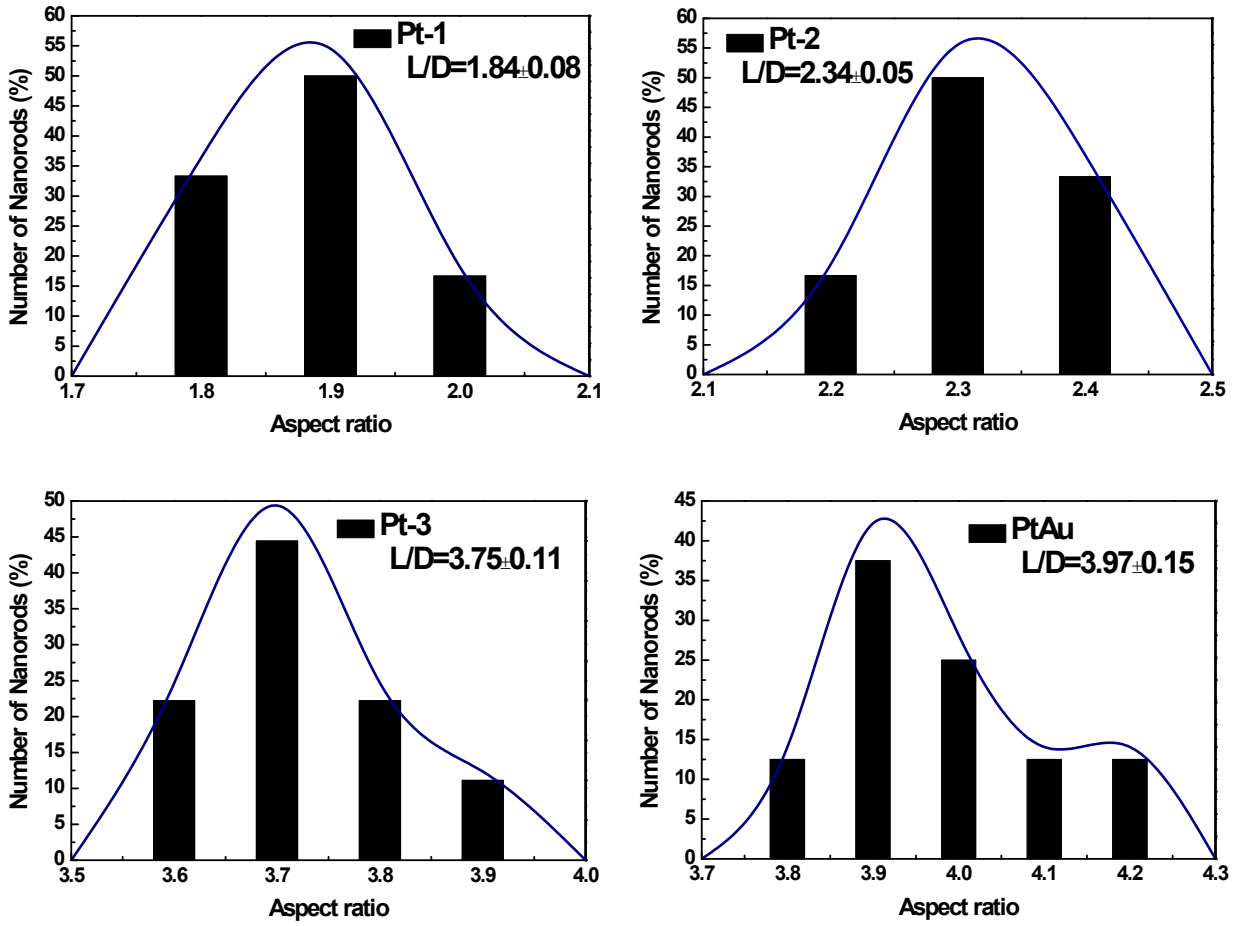

Figure S1 The aspect ratio distribution histograms of Pt-1, Pt-2, Pt-3, and PtAu NRs.

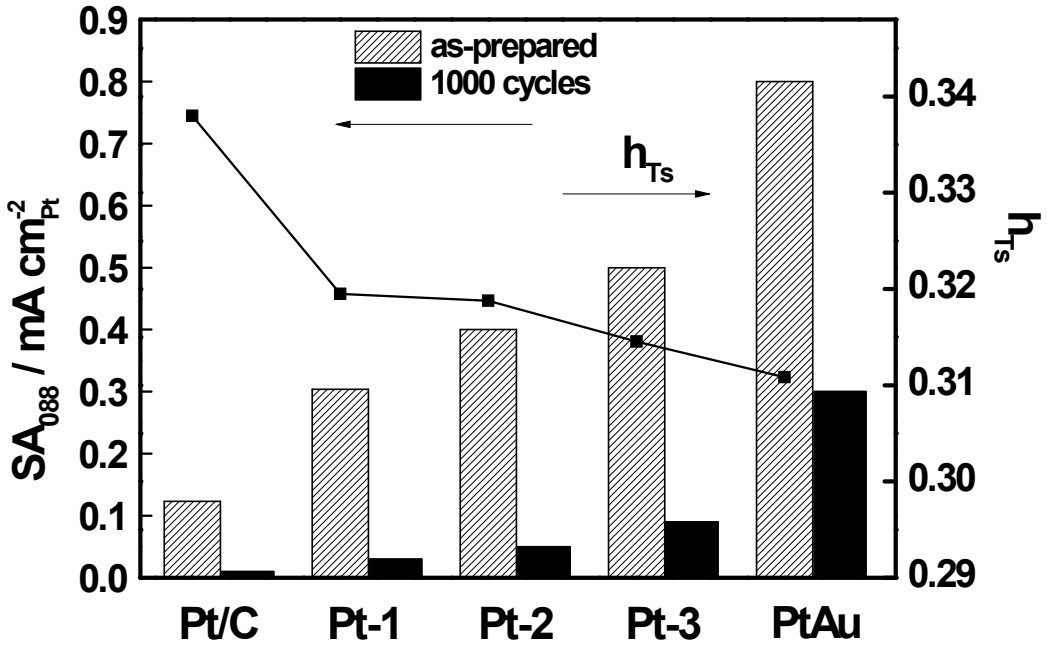

Figure S2 The comparisons of h_{Ts} and SA at 0.88 V before and after ADT for Pt/C and various NRs.