Supporting Information Available

Polyallylamine–Directed Green Synthesis of Platinum Nanocubes. Shape and Electronic Property Codependent Enhanced Electrocatalytic Activity

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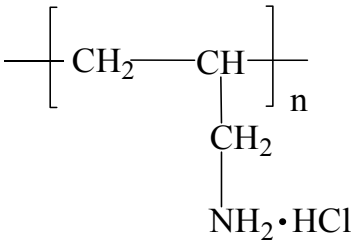

Fig. S1 Structure of Polyallylamine hydrochloride (PAH).

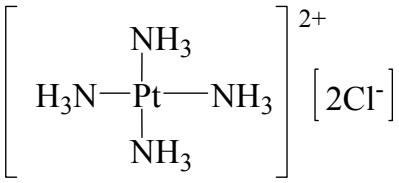

Fig. S2 Structure of tetraamine platinum (II) chloride ($[Pt^{II}(NH_3)_4]Cl_2$).

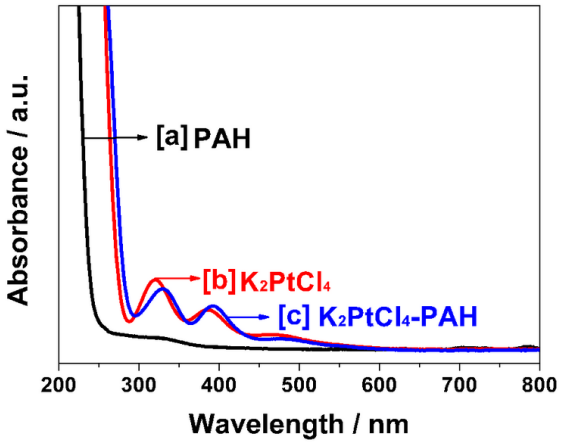

Fig. S3 UV–vis absorption spectra of (a) PAH solution (pH 3.0), (b) K_2PtCl_4 solution (pH 3.0), and (c) the mixture solution of PAH and K_2PtCl_4 (pH 3.0, molar ratio of PAH monomer to K_2PtCl_4 is 10:1).

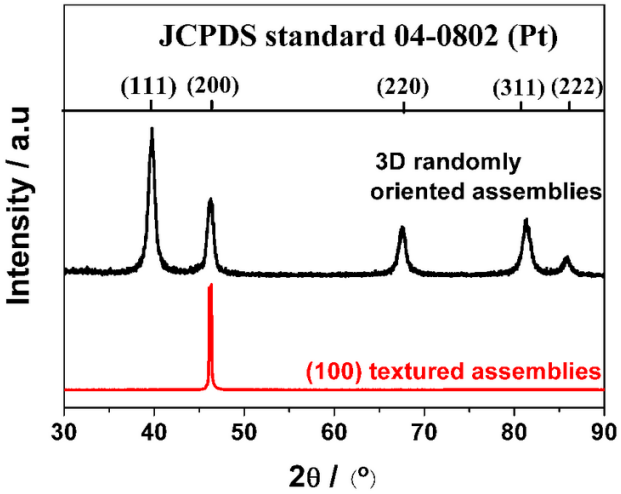

Fig. S4 XRD patterns of the randomly oriented and (100) textured Pt-NCs assemblies.

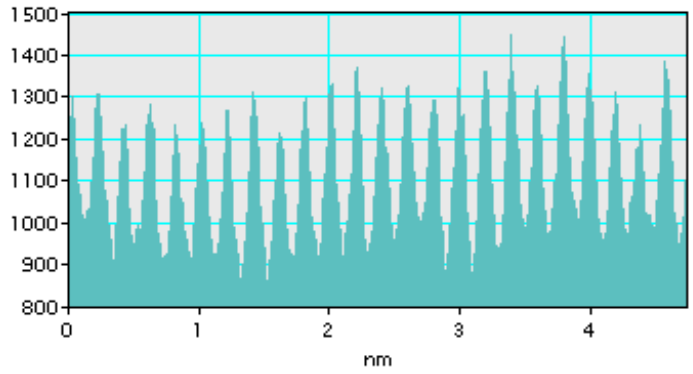

Fig. S5 The profile of the lattice fringes of the Pt-NCs in Figure 3C.

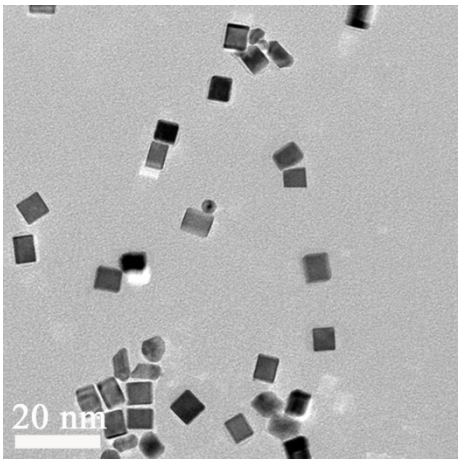

Fig. S6 TEM image of the re-obtained Pt-NCs.

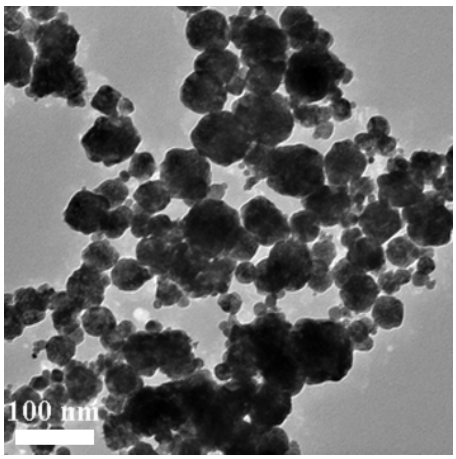

Fig. S7 TEM image of the Pt nanoparticles prepared in the absence of PAH.

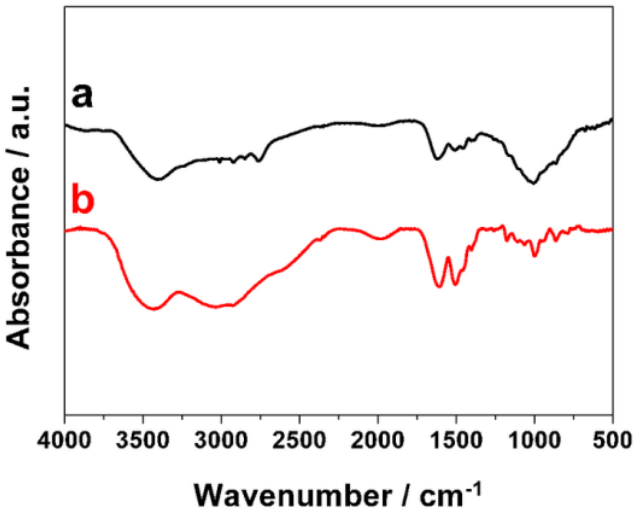

Fig. S8 FT-IR spectra of (a) the un-cleaning Pt-NCs and (b) pure PAH.

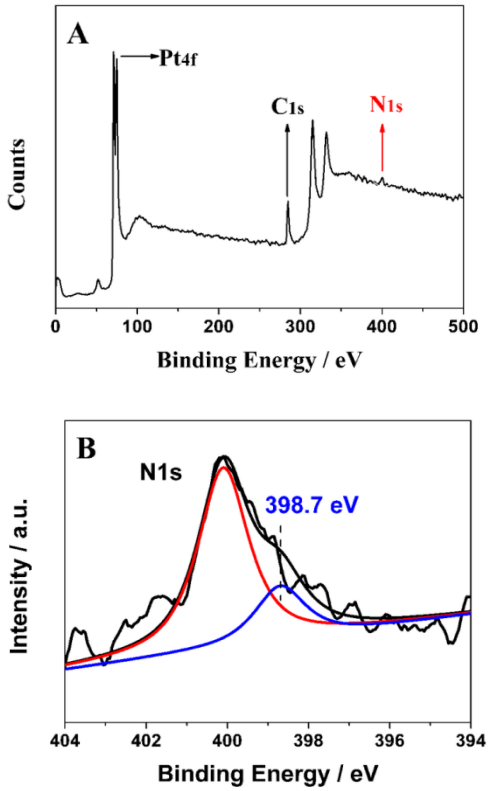

Fig. S9 XPS spectra of the un-cleaning Pt-NCs: (A) survey scan, (B) narrow scan for element N.

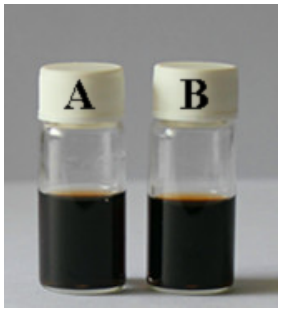

Fig. S10 Digital photographs of the un-cleaning Pt-NCs in water (1.0 mg mL^{-1}) after (a) 1 min and (b) 3 months of storage under ambient temperature.

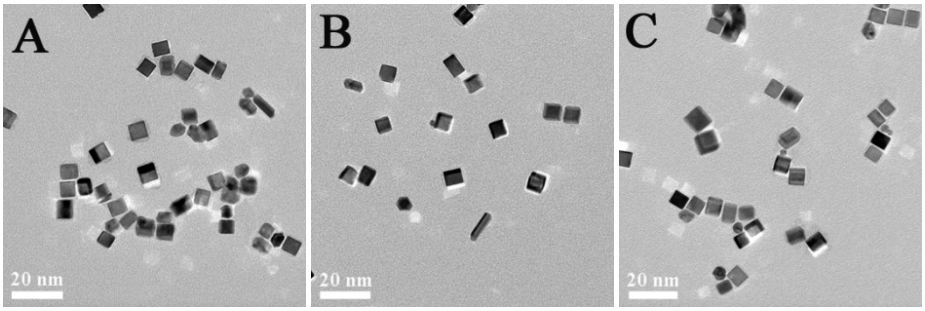

Fig. S11 TEM images of the Pt-NCs prepared at (A) pH 3.0, (B) pH 6.0 and (C) pH 9.0.

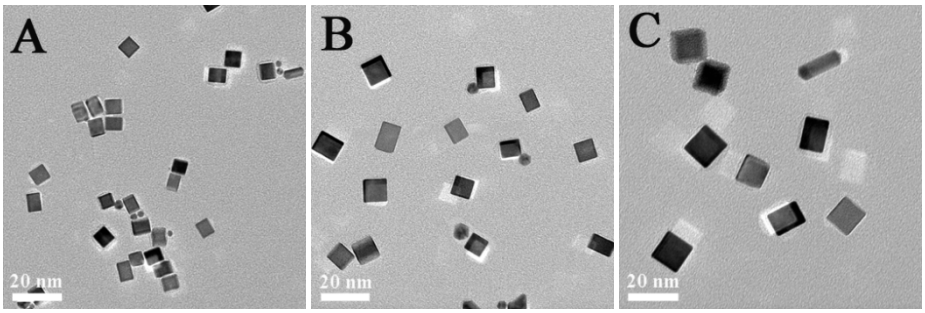

Fig. S12 TEM images of the Pt-NCs synthesized by varying PAH/Pt^{II} feeding ratio of (A) 10:1, (B) 20:1 and (C) 30:1 at pH 3.0.

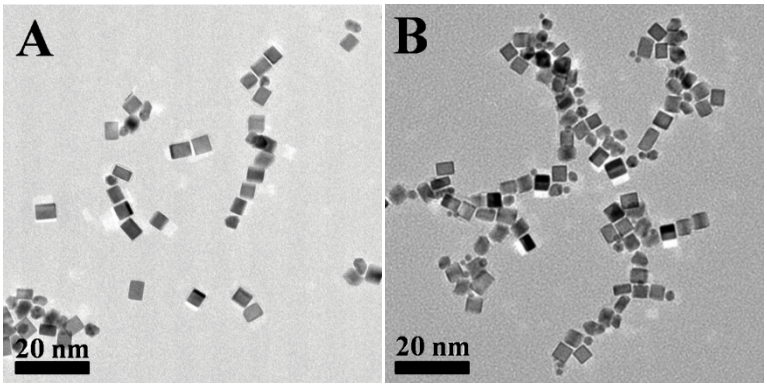

Fig. S13 TEM image of the Pt-NCs after the accelerated durability test.

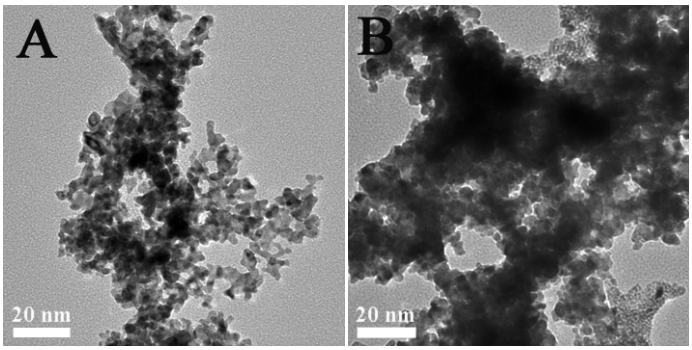

Fig. S14 TEM images of the E-TEK Pt black (A) before and (B) after the accelerated durability test.

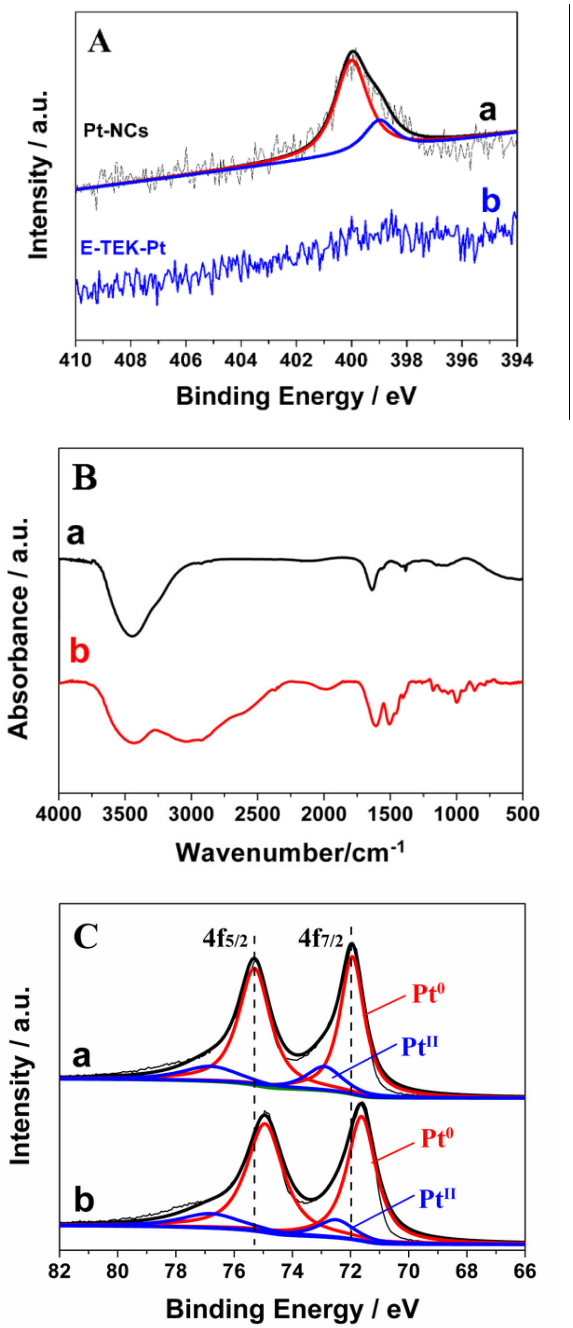

Fig. S15 (A)XPS spectra of (a) the Pt-NCs after UV/Ozone and electrochemical cleaning and (b) E-TEK Pt plack in the N 1s region. (B) FT-IR spectra of (a) the Pt-NCs after UV/Ozone treatment and (b) pure PAH. (C) XPS spectra of (a) the Pt-NCs after UV/Ozone and electrochemical cleaning and (b) E-TEK Pt plack in the Pt 4f region.

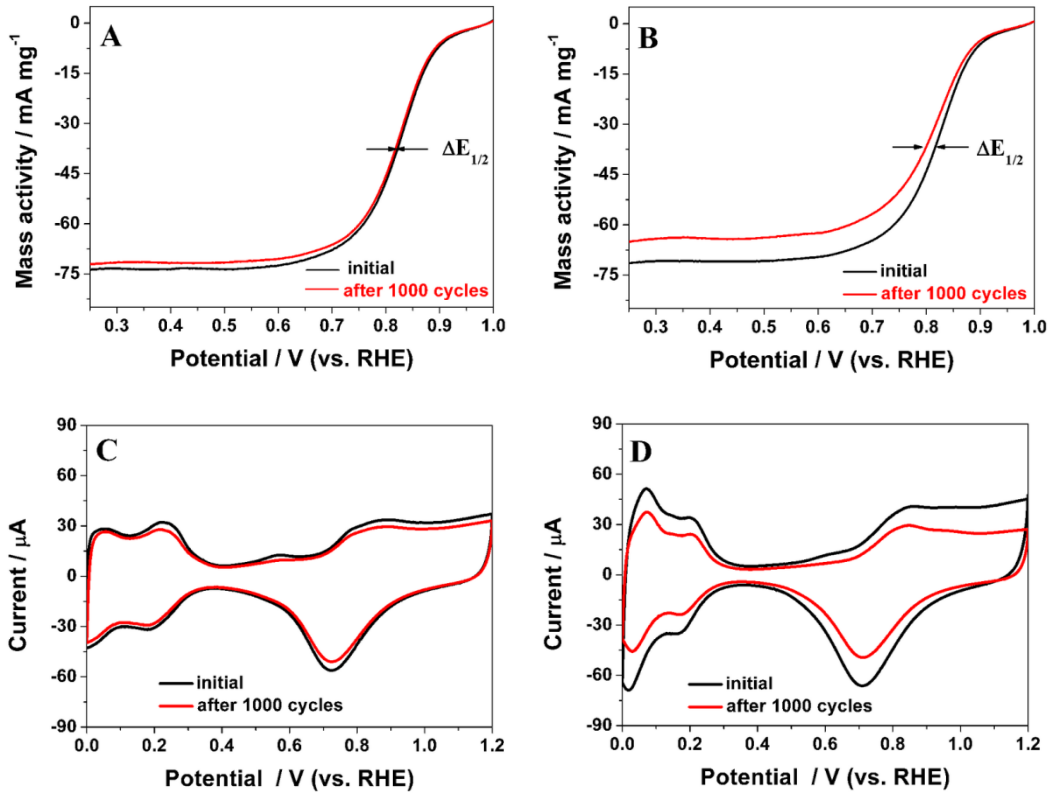

Fig. S16 ORR polarization curves for (A) the Pt-NCs and (B) E-TEK Pt black in O_2-saturated 0.1 M $HClO_4$ solution before and after 1000 potential cycles at a scan rate of 5 mV s^{-1} and rotation rate of 1600 rpm; CV curves for (C) the Pt-NCs and (D) E-TEK Pt black in O_2-saturated 0.1 M $HClO_4$ solution before and after 1000 cycles at a scan rate of 50 mV s^{-1}.