Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A

Supporting Information

Uniform Epitaxial Growth of Pt on Fe_3O_4 Nanoparticles; Synergetic Enhancement to Pt Activity for the Oxygen Reduction Reaction

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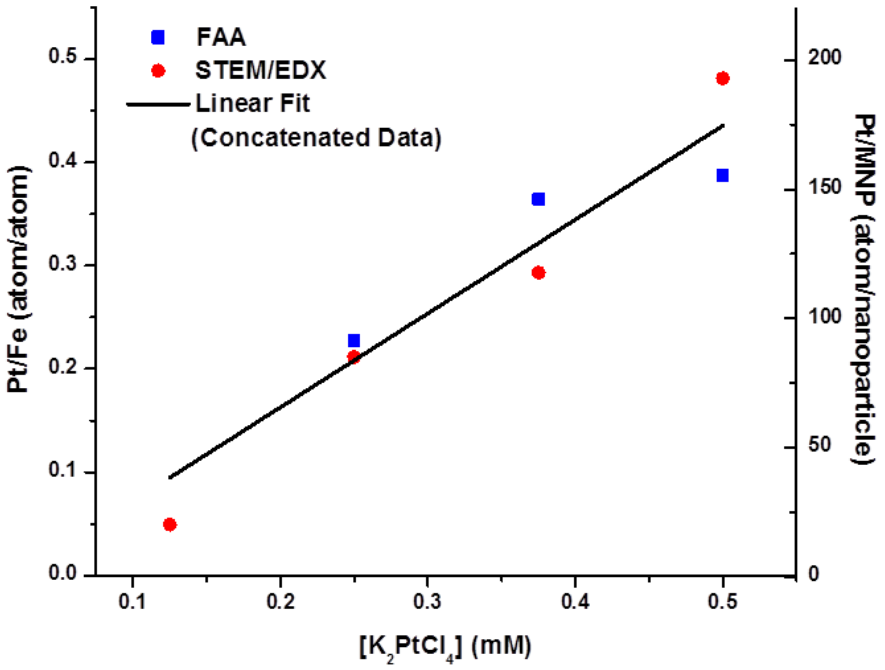

Fig. 1 Relationship between K_2PtCl_4 concentration and resulting composition of PtBPC-MHNs, plotted using both FAA and STEM/EDX data with y-axis scales for both Pt/Fe atomic ratio and Pt/MNP atom/nanoparticle ratio.

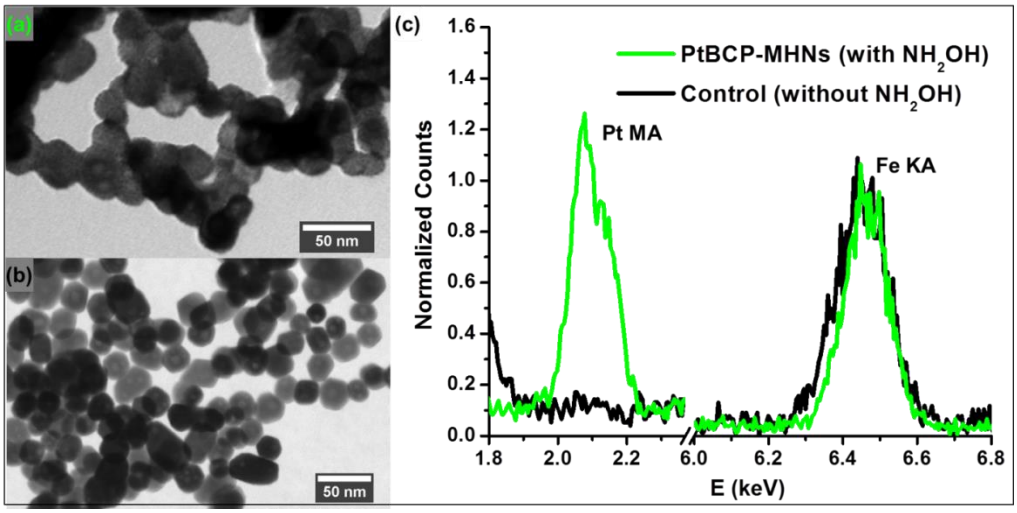

Fig. 2 STEM of nanoparticles resulting from (a) PtBCP-MHN synthesis and (b) control synthesis without NH_2OH. (c) Corresponding EDX spectra for both species, spectra normalized by Fe KA peak maximum.

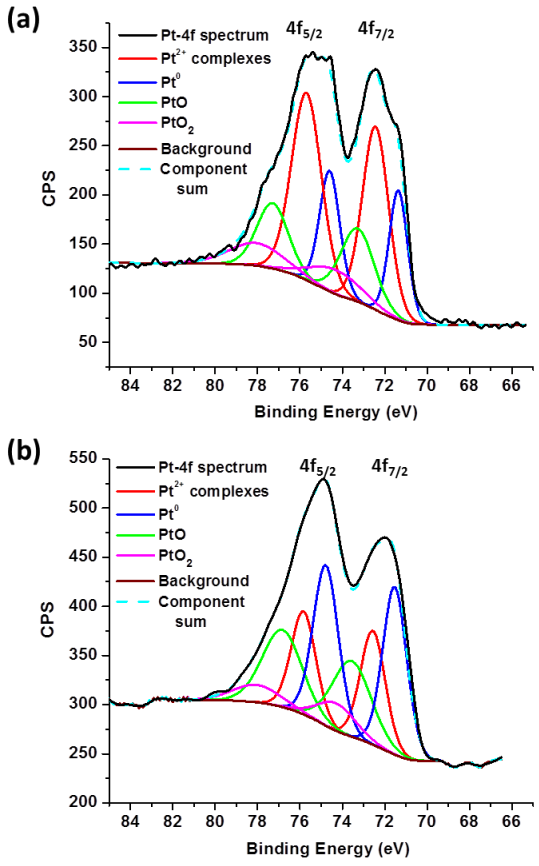

Fig. 3 Deconvoluted Pt-4f XPS spectra corresponding to PtMHN/C samples after thermal treatment in air at a) 190°C and b) 240°C.

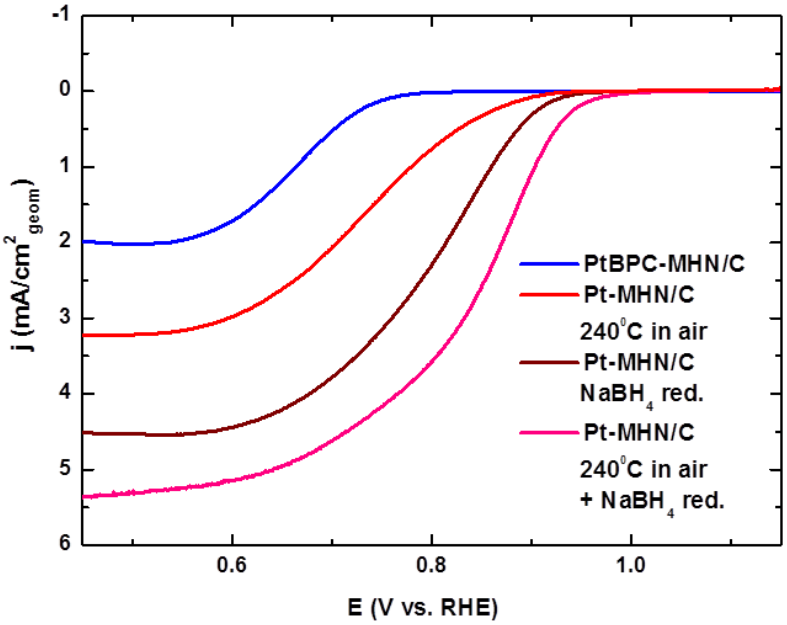

Fig. 4 Rotating disk voltammograms (cathodic scan, 1600 rpm, 5 mV/s, O_2-sat. 0.10 M KOH) for AT-MNP/C, PtBPC-MHN/C, and three different types of Pt-MHN/C species, synthesized under different conditions as labeled in the legend.

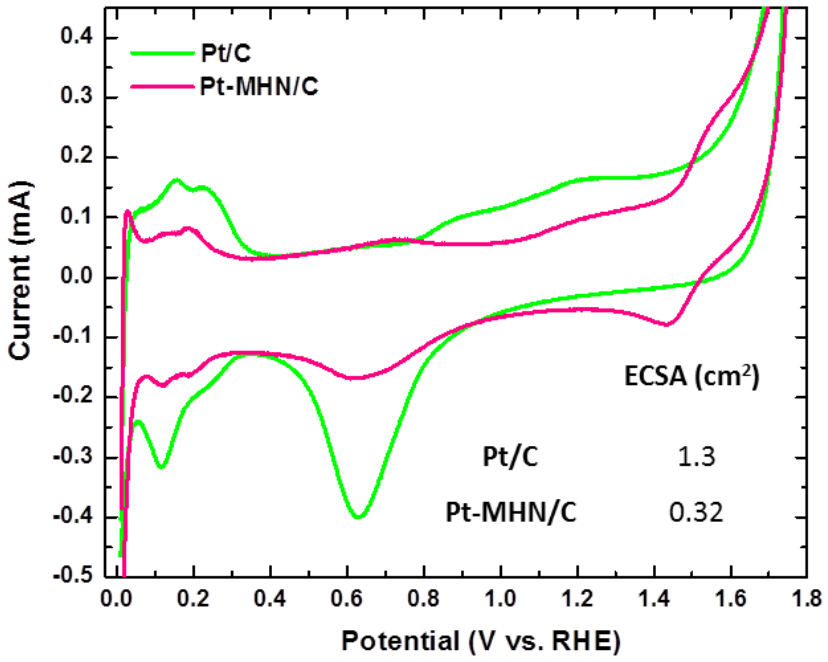

Fig. 5 Cyclic voltammograms (100 mV/s, argon-purged 0.10 M $HClO_4$) for Pt/C commercial catalyst and Pt-MHN/C. Inset showing ECSA values for each catalyst film.

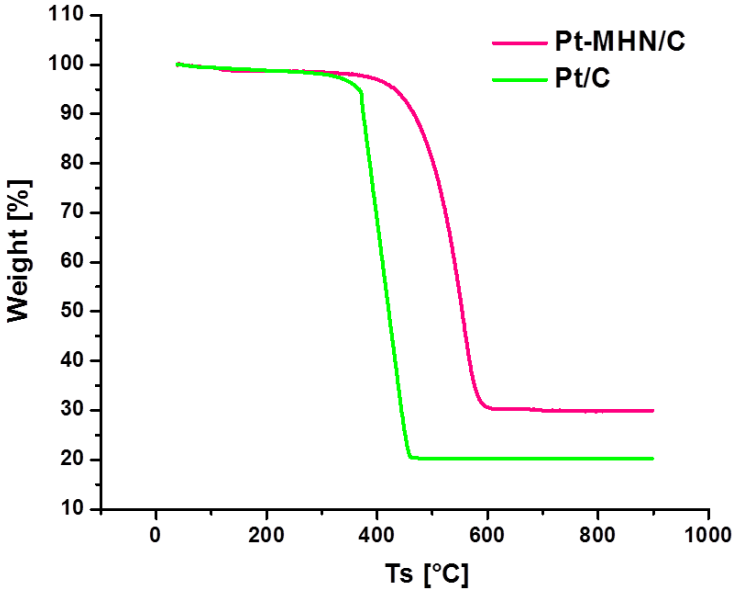

Fig. 6 Thermogravimetric analysis for Pt-MHN/C and Pt/C commercial catalyst.

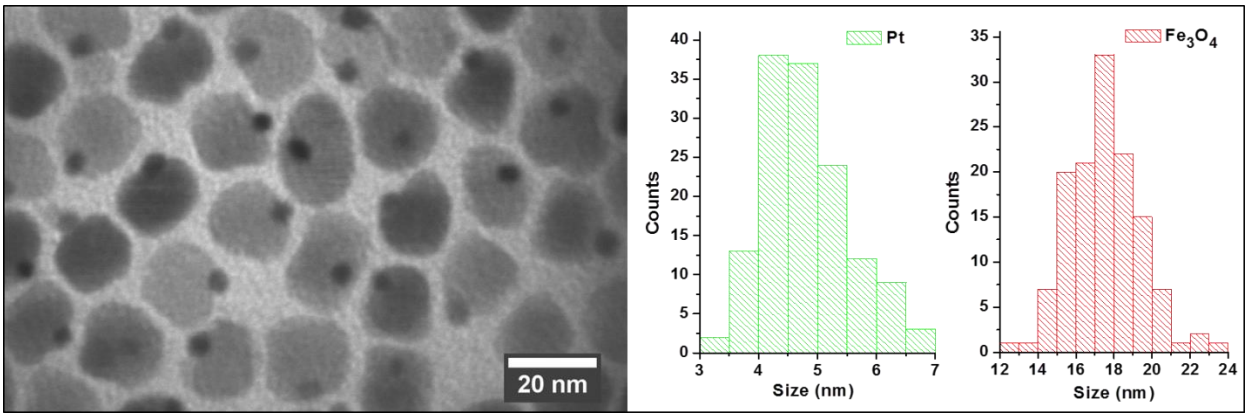

Fig. 7 STEM image and size distribution histograms for Pt-Fe_3O_4 heterodimers (Pt-MHDs).