Supporting Information

One-step synthesis of carbon-supported foam-like platinum with enhanced activity and durability

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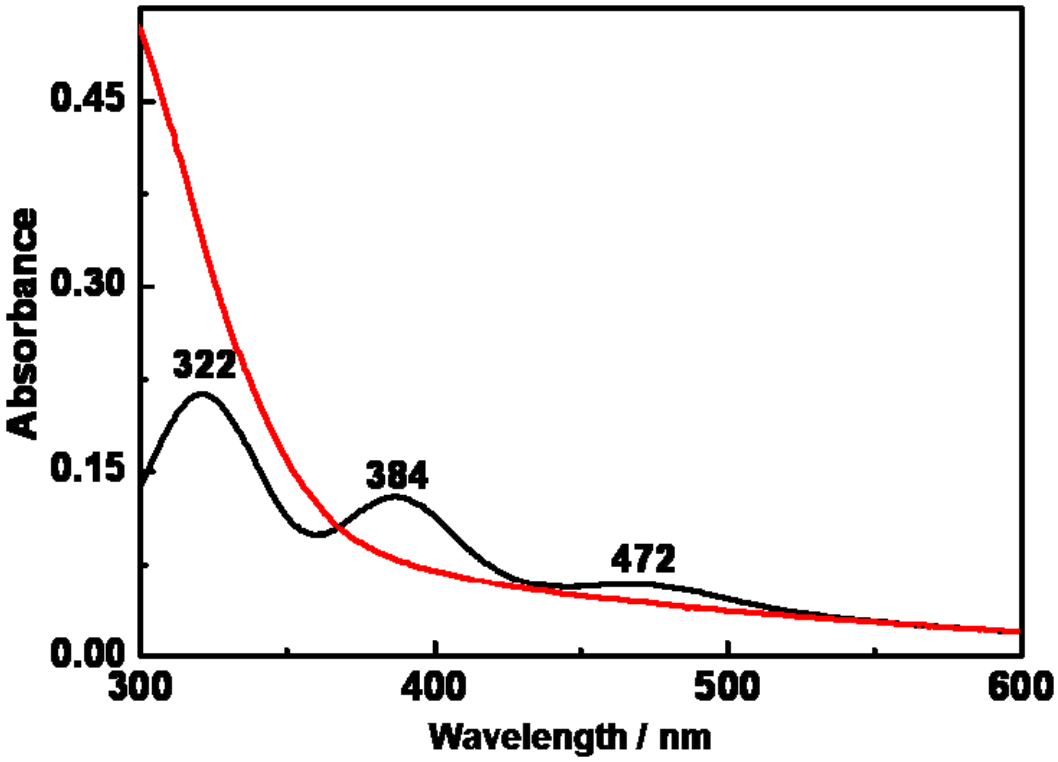

Fig. S1 UV-visible spectrum of the supernatant of a synthetic system after 2 h of reaction (red line). A representative UV-visible spectrum of 10 mM Pt (II) aqueous solution (black line) is included to show the absorption maxima for the platinum complexes. *Reaction conditions:* DSPC/cholesterol (5 mM, 1 mL), Vulcan XC-72 carbon black (4.76 mg), K_2PtCl_4 (20 mM, 1 mL), and AA (26.4 mg) under ambient conditions.

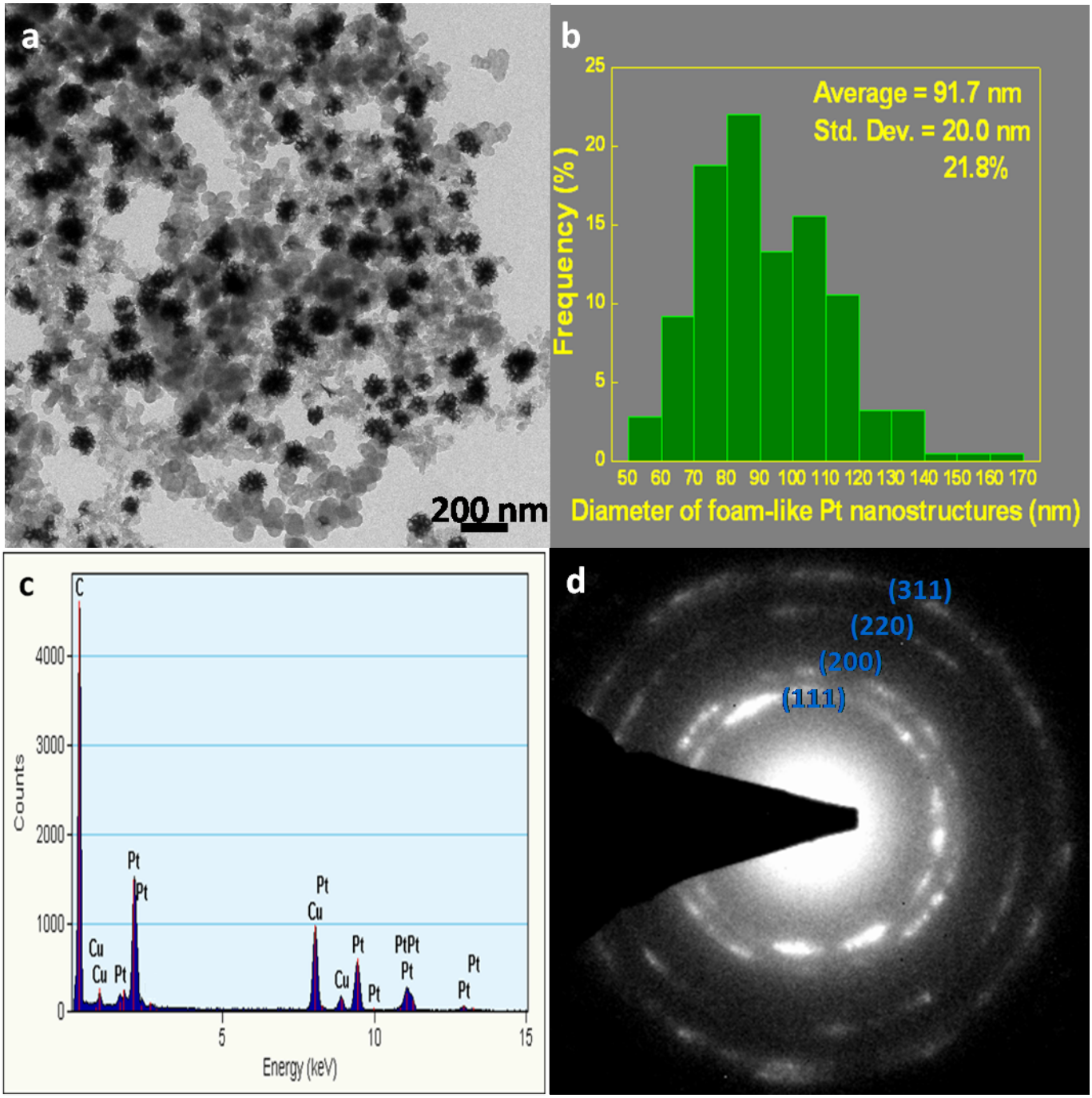

Fig. S2 (a) TEM image of Pt foam/C, (b) plot of frequency versus diameter for more than 200 randomly selected carbon supported Pt foam with an average size, standard deviation, and percentage ratio of the standard deviation to the average size, (c) Energy-dispersive X-ray spectroscopy (EDX), and (d) selected area electron diffraction (SAED) pattern of Pt foam/C.

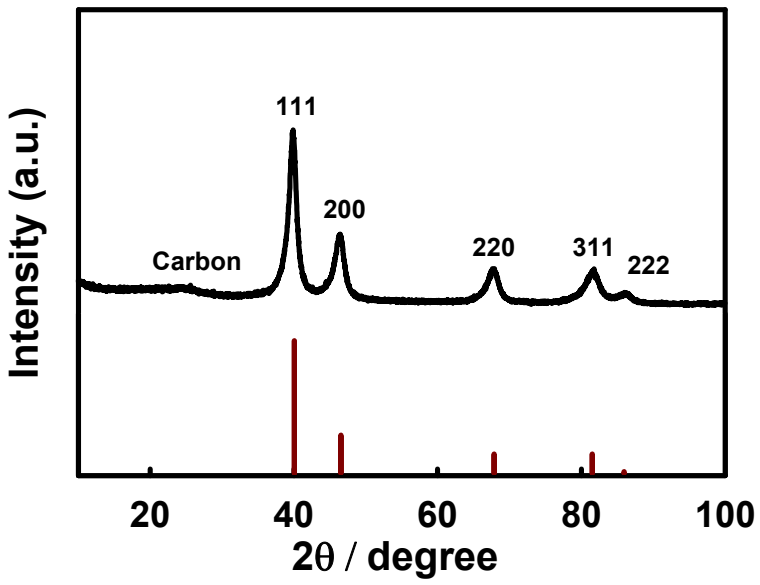

Fig. S3 XRD pattern of the Pt foam/C accompanied by the standard XRD pattern of Pt. *Reaction conditions:* DSPC/cholesterol (5 mM, 30 mL), Vulcan XC-72 carbon black (144 mg), K_2PtCl_4 aq. (10 mM, 30 mL), and AA (792 mg) under ambient conditions.

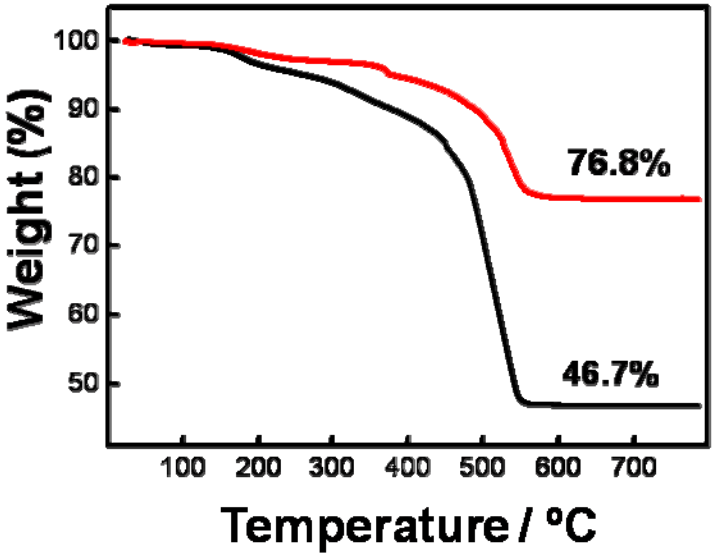

Fig. S4 TG diagram of Pt foam/C with different metal loadings. The weight loss below 100 °C is due to the release of adsorbed water molecules, and the weight change in the range of 100-400 °C may come from Pt-catalyzed slow pyrolysis of carbon species, and the sharp weight loss beginning at 400°C likely corresponds to the burning of carbon.

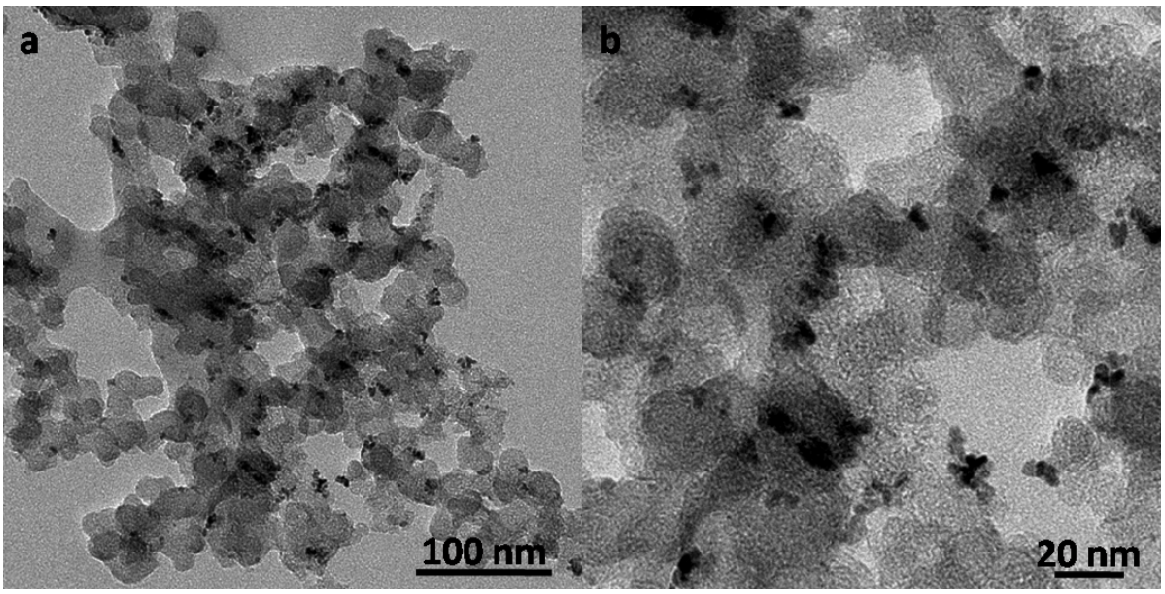

Fig. S5 TEM image of nascent dendritic Pt nanosheets and Pt nanoparticles supported on carbon at low (a) and high (b) magnification. *Reaction conditions:* DSPC/cholesterol (5 mM, 1 mL), Vulcan XC-72 carbon black (4.76 mg), K_2PtCl_4 (1 mM, 1 mL), and AA (26.4 mg) under ambient conditions.

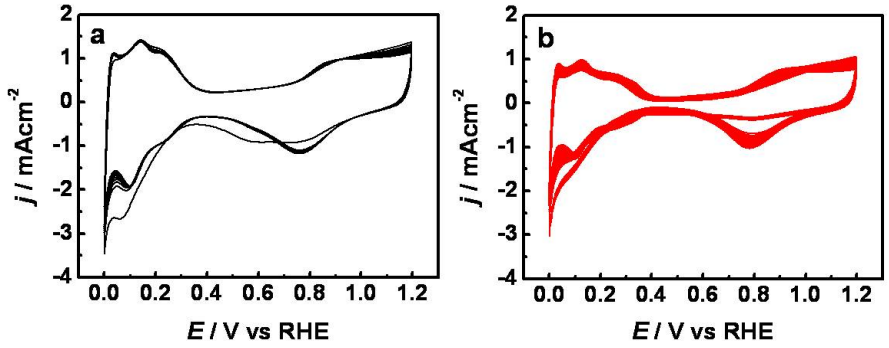

Fig. S6 Initial 10 consecutive CV curves for commercial Pt/C (a) and Pt foam/C (b) in N_2-purged $HClO_4$ (0.1 M) aqueous solution at 25 ^{o}C (0-1.2 V vs RHE, sweep rate 100 mVs^{-1}).

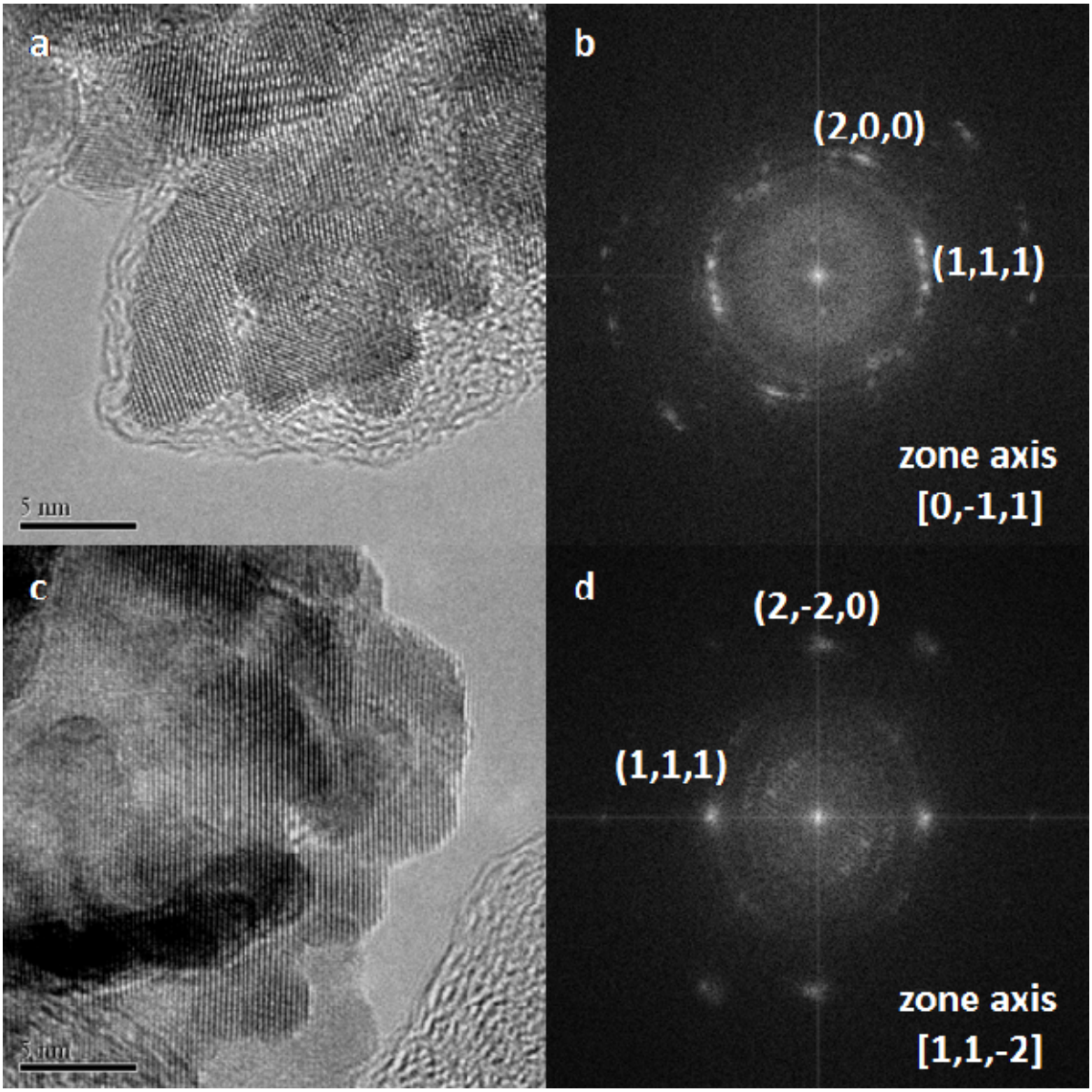

Fig. S7 HRTEM images of randomly selected constituent dendritic nanosheets of Pt foam/C (a) and (c) and their corresponding electron diffration patterns (b) and (d) obtained by FFT with labelled crystal planes and zone axes.

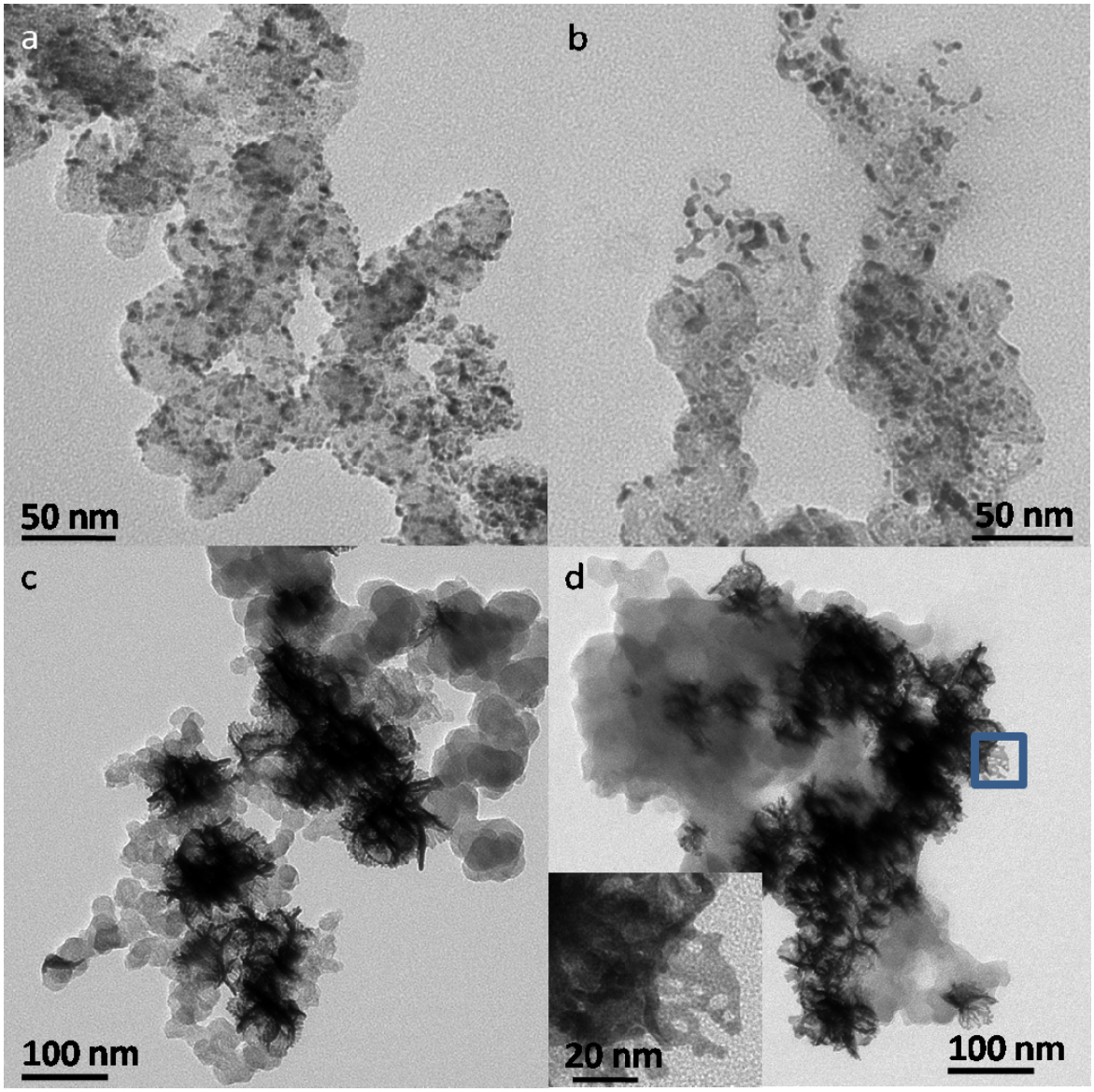

Fig. S8 TEM images of commercial Pt/C and Pt foam/C before (a, c) and after (b, d) accelerated durability test. (Inset: magnified area selected in the blue square showing nanopores.)