Supplementary Information

for

Electrodeposition of PtNi bimetallic nanoparticles on three-dimensional graphene for highly efficient methanol oxidation

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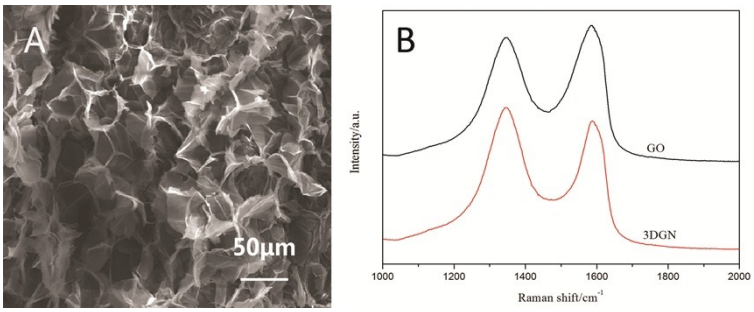

Fig. S1.(A) SEM image of 3DGN; (B) Raman spectra of GO (black line) and 3DGN (red line)

Fig. S1(A) shown the SEM image of 3DGN. The honeycomb structure, a typical morphology of 3DGN, can be found easily which proved that the 3DGN was actually synthesized. Also, the Raman spectra of graphene oxide (GO) and 3DGN were provided in Fig. S1(B). GO and 3DGN display two peaks around 1345 cm^{-1} and 1585 cm^{-1} corresponding to the D and G bands, respectively. The D band is related to structural defects in the curved graphene sheet or partially disordered structures of graphitic domains, while the G band corresponds to the graphitic hexagon-pinch pattern. The D/G intensity ratio increases from GO to 3DGN, which is due to the defects introduced into the 3DGN during reduction.

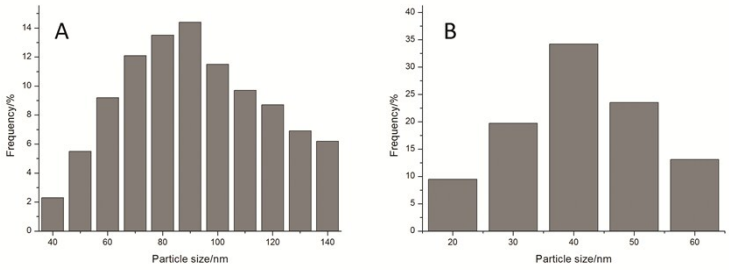

Fig. S2. Histograms of particle size distributions for Pt (A) and Pt/3DGN (B).

The average diameters of Pt nanoparticles deposited on GCE are ~90 nm (Fig. S2(A)), and on 3DGN are ~55 nm, (Fig. S2(B)).

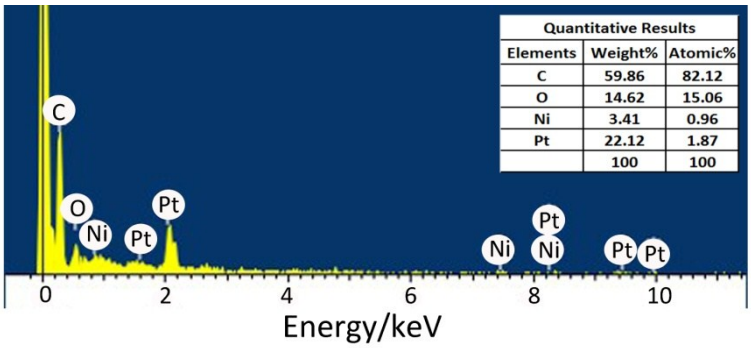

Fig. S3. The EDS spetra of PtNi/3DGN composite.

The composition of PtNi/3DGN composite was estimated by EDS (shown in Fig. S3), revealing the presence of C, O, Pt and Ni. Based on the EDS spectra, the atomic ratio of Pt/Ni is about 2:1.