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

Electronic Supplementary Information

Ultrafine nickel-cobalt alloy nanoparticles incorporated into three-dimensional porous graphitic carbon as electrode material for supercapacitor

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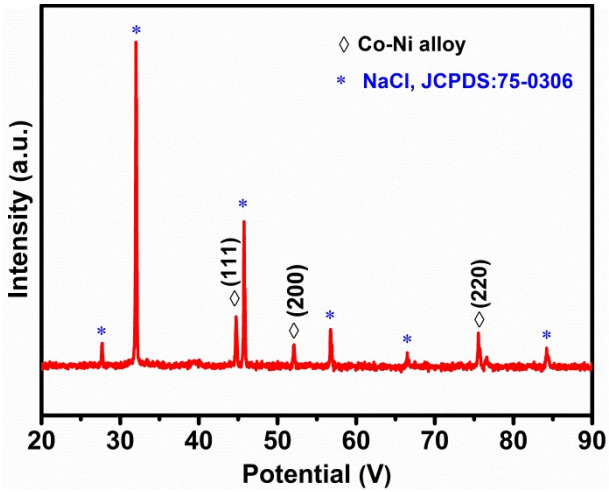

Fig. S1 The XRD pattern of Ni-Co-NaCl@GC.

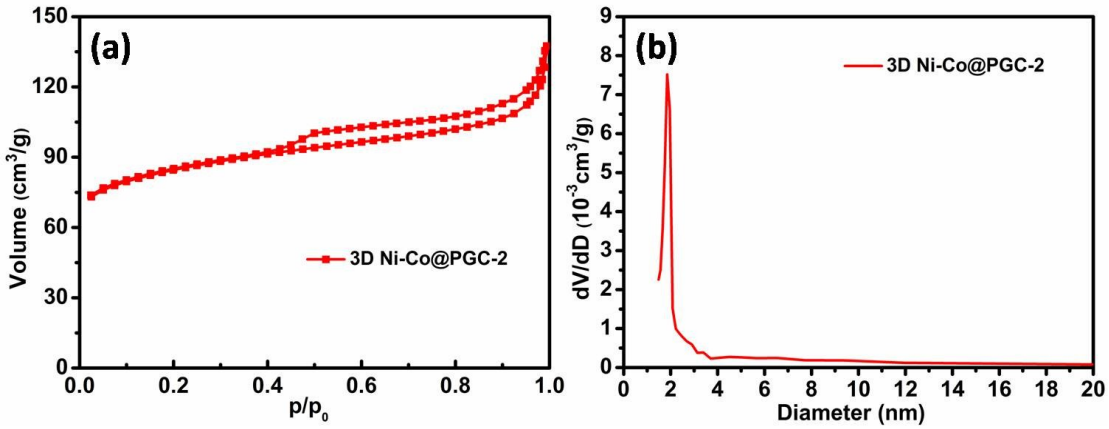

Fig. S2 (a) N_2 adsorption-desorption isotherm of 3D Ni-Co@PGC-5 composite using 5 g NaCl, and (b) the corresponding pore-size distribution curve.

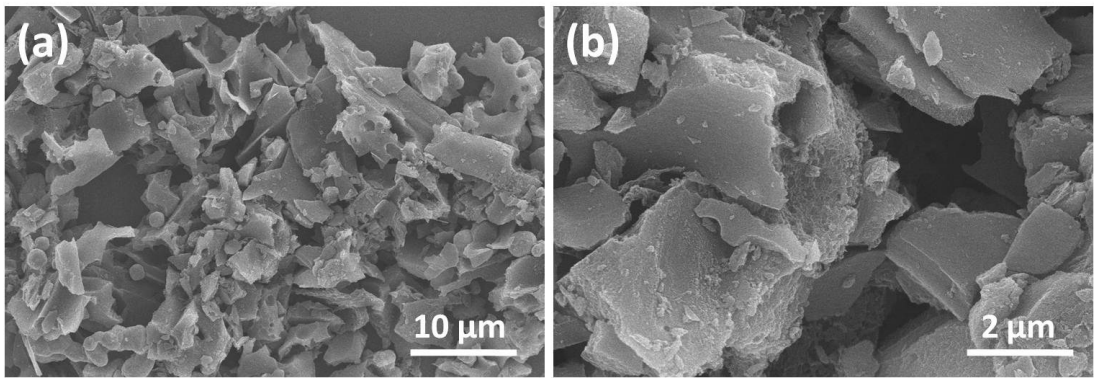

Fig. S3 (a), (b) Low and high magnification SEM images of 3D Ni-Co@GC composite.

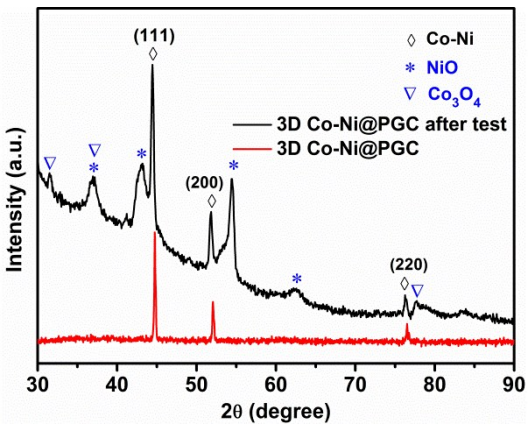

Fig. S4 XRD patterns of the 3D Ni-Co@PGC composites before and after electrochemical test in 6.0 M KOH by CV test at a scan rate of 50 mV s^{-1} for 3 h and 400 cycles galvanostatic charge–discharge process, indicating the formation of NiO and Co_3O_4 during the electrochemical test.

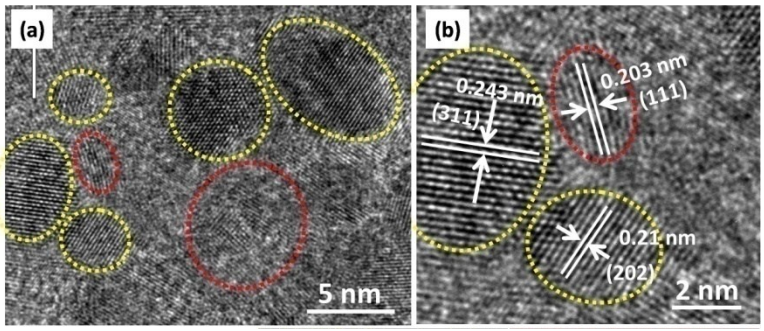

Fig. S5 (a), (b) Low and high magnification TEM images of 3D Ni-Co@PGC composite after electrochemical test at 6.0 M KOH electrolyte, confirming that the surface of Ni-Co alloy nanoparticles were oxidized to corresponding metal oxides. The red lines indicate the original Ni-Co nanoparticles exist still, and the yellow lines represent the new NiO and Co_3O_4 phases formed, especially, the plane spacing of 0.243 nm corresponds to (311) plane of NiO, and 0.209 nm corresponds to (202) plane of Co_3O_4.

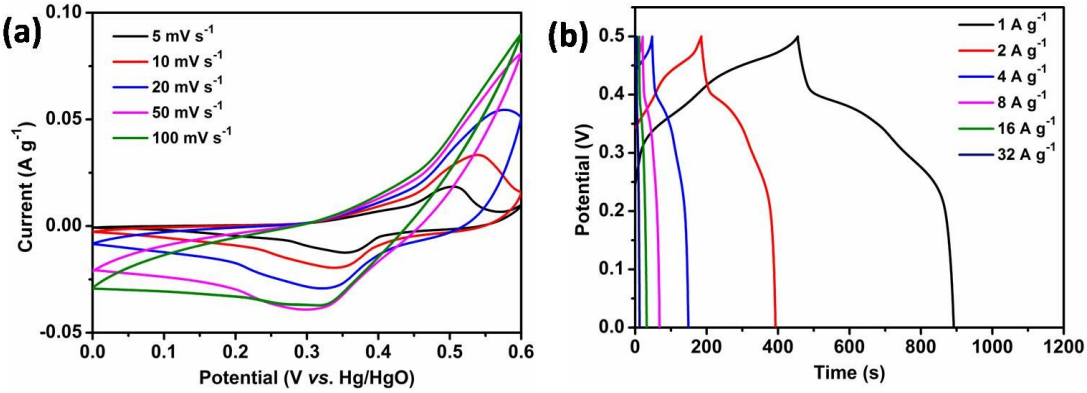

Fig. S6 (a) Cyclic voltammogram curves at various scan rates ranging from 5 mV s^{-1} to 100 mV s^{-1} and (b) Charge–discharge curves measured at different current densities of 3D Ni-Co@GC composite.

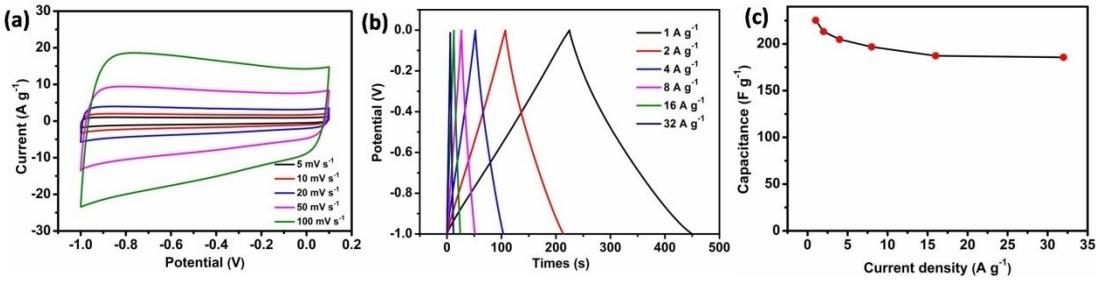

Fig. S7 The electrochemical performance of the active carbon electrode in 6M KOH electrolyte. (a) cyclic voltammetry; (b) galvanostatic charge-discharge; (c) specific capacitance vs. current density.