Supporting information

The role of iodine in the enhancement of the supercapacitance properties of HI-treated flexible reduced graphene oxide films: an experimental study with insights from DFT simulations

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Equations for calculation of supercapacitor properties:

In the case of symmetric supercapacitor device, the specific capacitance of electrode material has been calculated from CV plot, by following equation number 1.

$$Csp = 2\int I(V)dV/vmV \text{ ....(S1)}$$

Where ∫I(V)dV is the integrated surface area obtained under the CV plot, m is the mass of the electrode material, ν is the scan rate, and V is the working potential.

In the case of symmetric supercapacitor device, the specific capacitance has been calculated from GCD plot, by following equation number 2.

$$C_{sp} = 4\frac{I}{m(dV/dt)} \text{ ....(S2)}$$

Where m is the total mass of electrode materials and dV/dt is the slope of the discharge curve at constant current ‘I’.

The energy density (ED) and power density (PD) performance has been calculated from CV plot, by following the equation numbers 3 and 4.

$$\mathrm{E.D.} = \frac{1}{2}\mathrm{Csp}(\Delta \mathrm{V})^2 \text{ ....(S3)}$$

$$\mathrm{P.D.} = \frac{1}{2}\mathrm{Csp}\ (\Delta \mathrm{V})\ \nu \text{ ....(S4)}$$

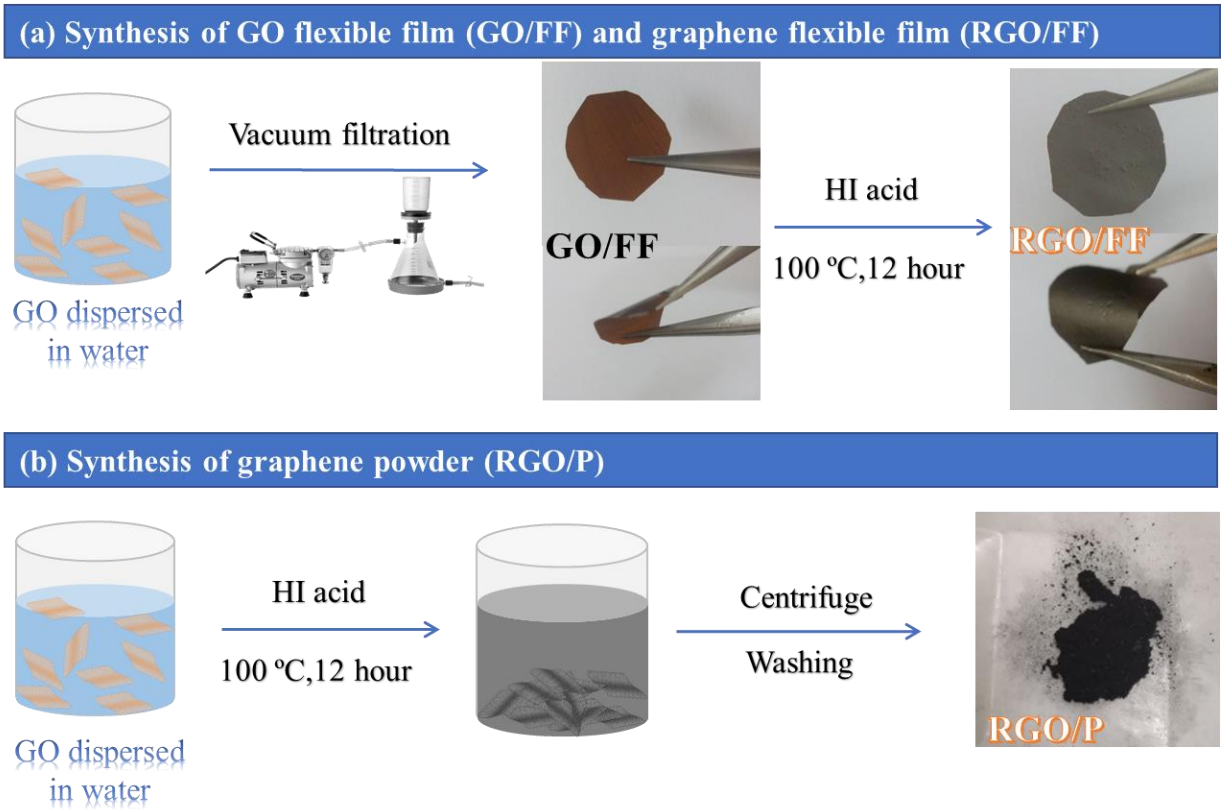

Figure S1. *Scheme shows the synthesis process for GO/FF, RGO/FF and RGO/P*

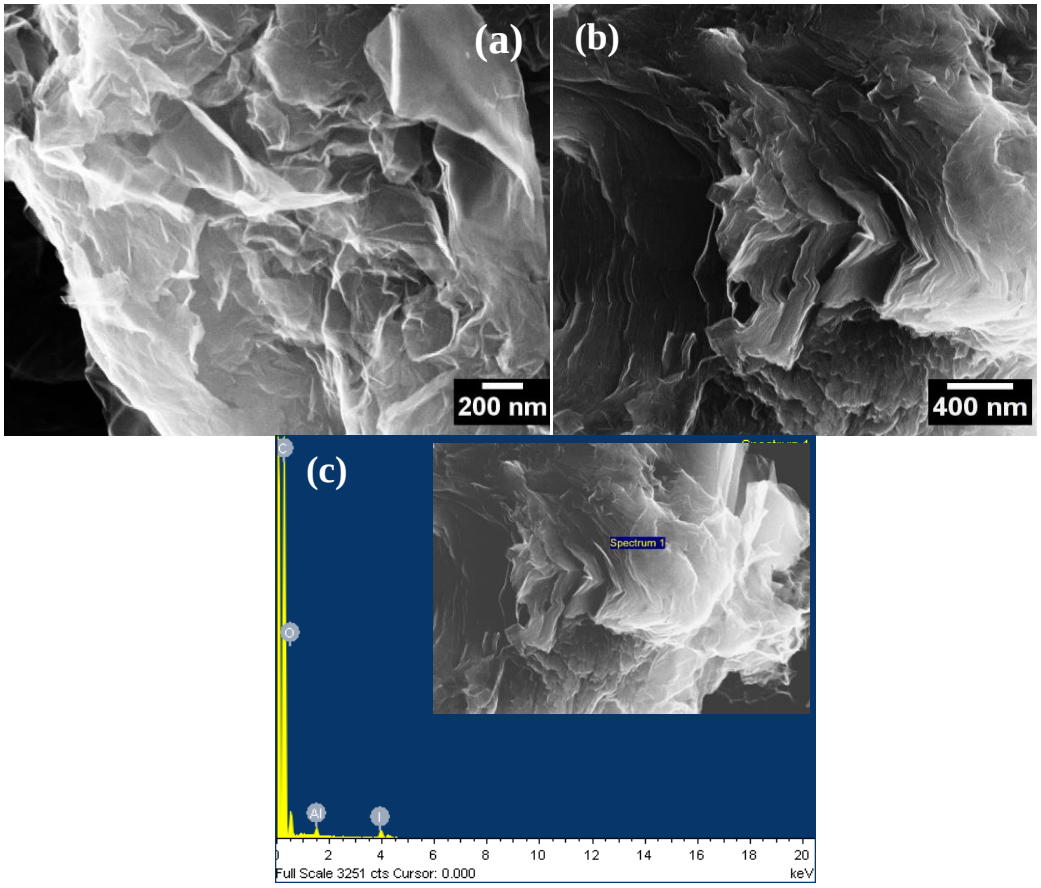

Figure S2. (a and b) FESEM images and (c) EDS spectrum of RGO/P

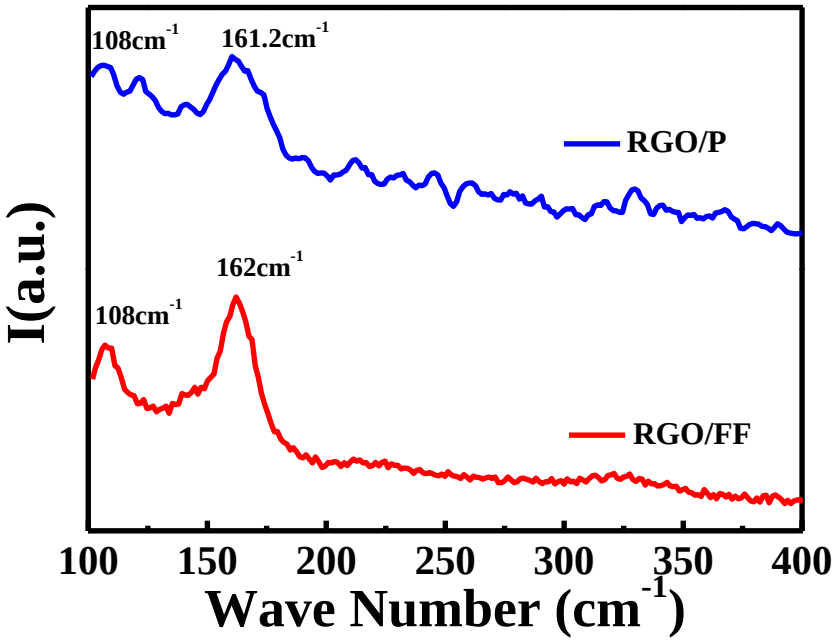

Figure S3. Raman spectra of RGO/FF and RGO/P

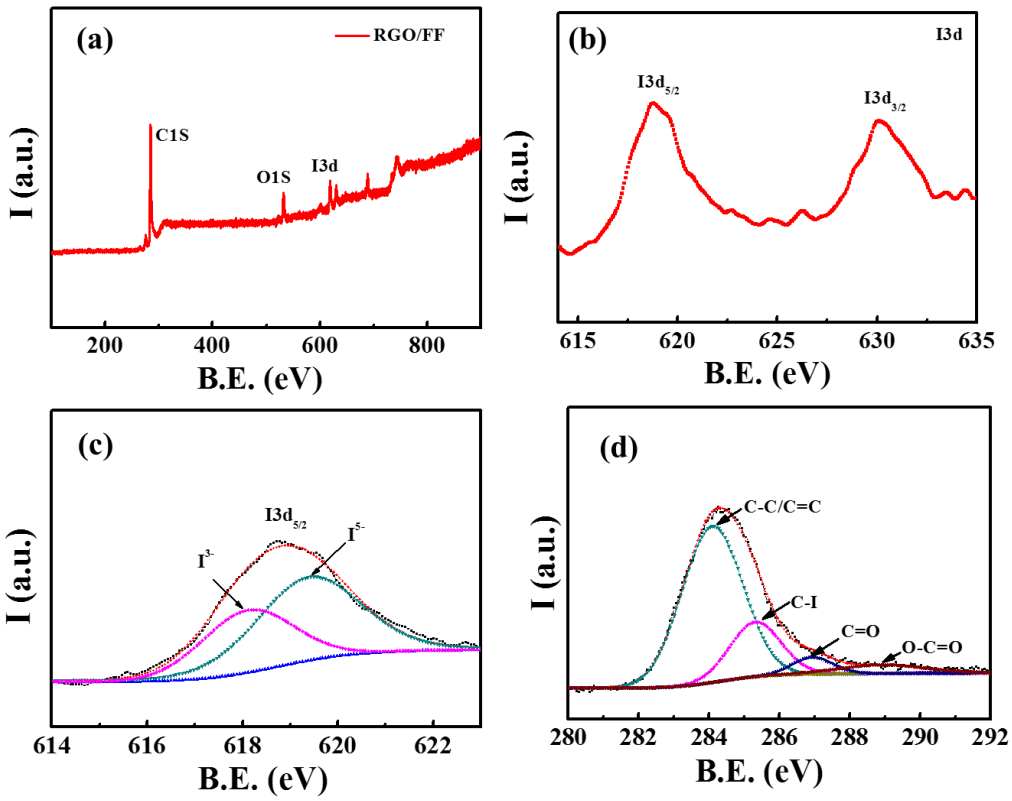

Figure S4. (a) XPS full spectrum of graphene film, high resolution XPS spectra of (b, c) I3d and (d) C1s

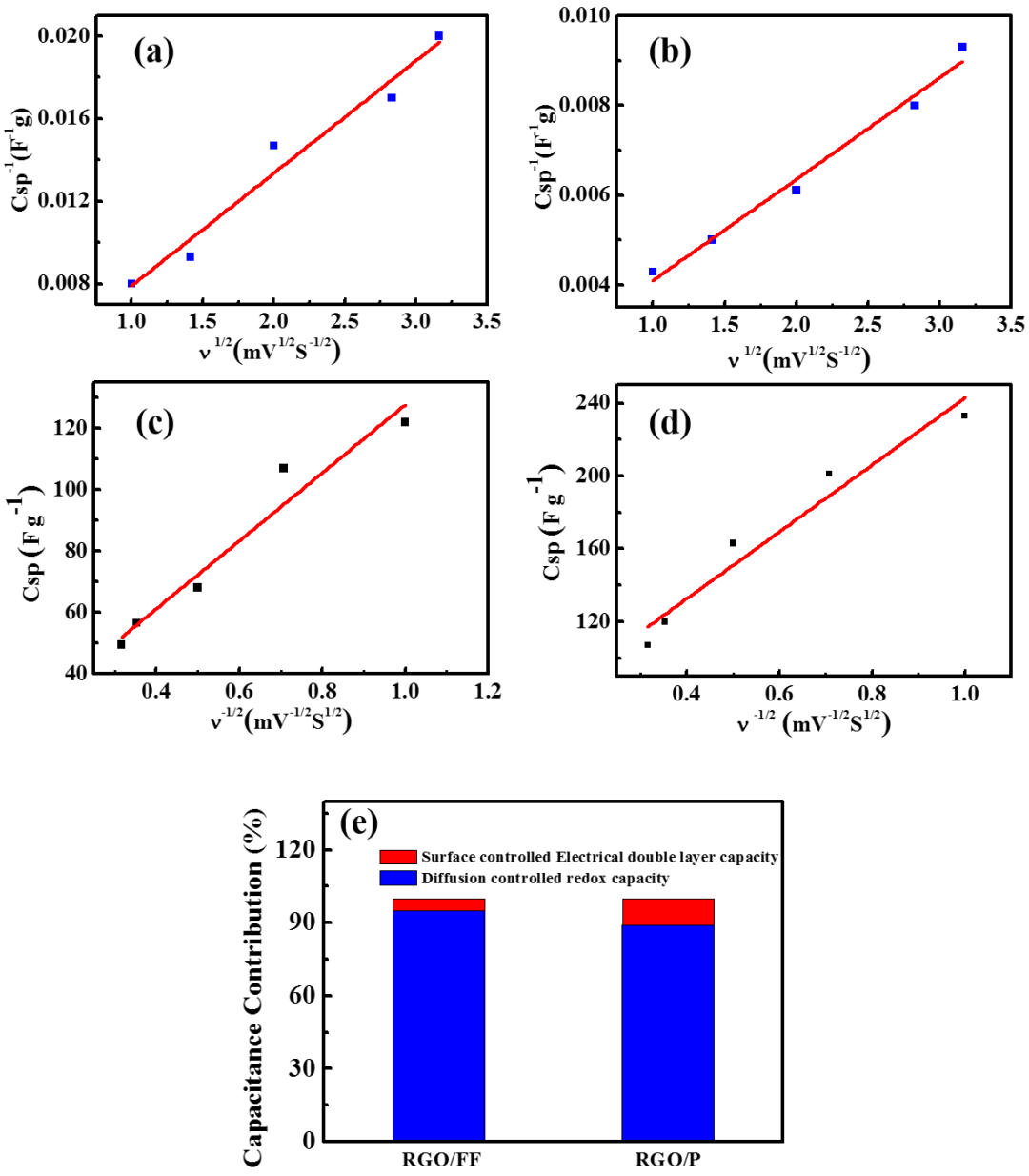

Figure S5. Plot of Csp^{-1} and $\nu^{1/2}$ of (a) RGO/FF and (b) RGO/P, Plot of Csp and $\nu^{-1/2}$ of (c) RGO/FF and (d) RGO/P and (e) bar plot of surface controlled electrical double layer and the diffusion controlled pseudocapacitance contribution ratio of RGO/FF and RGO/P

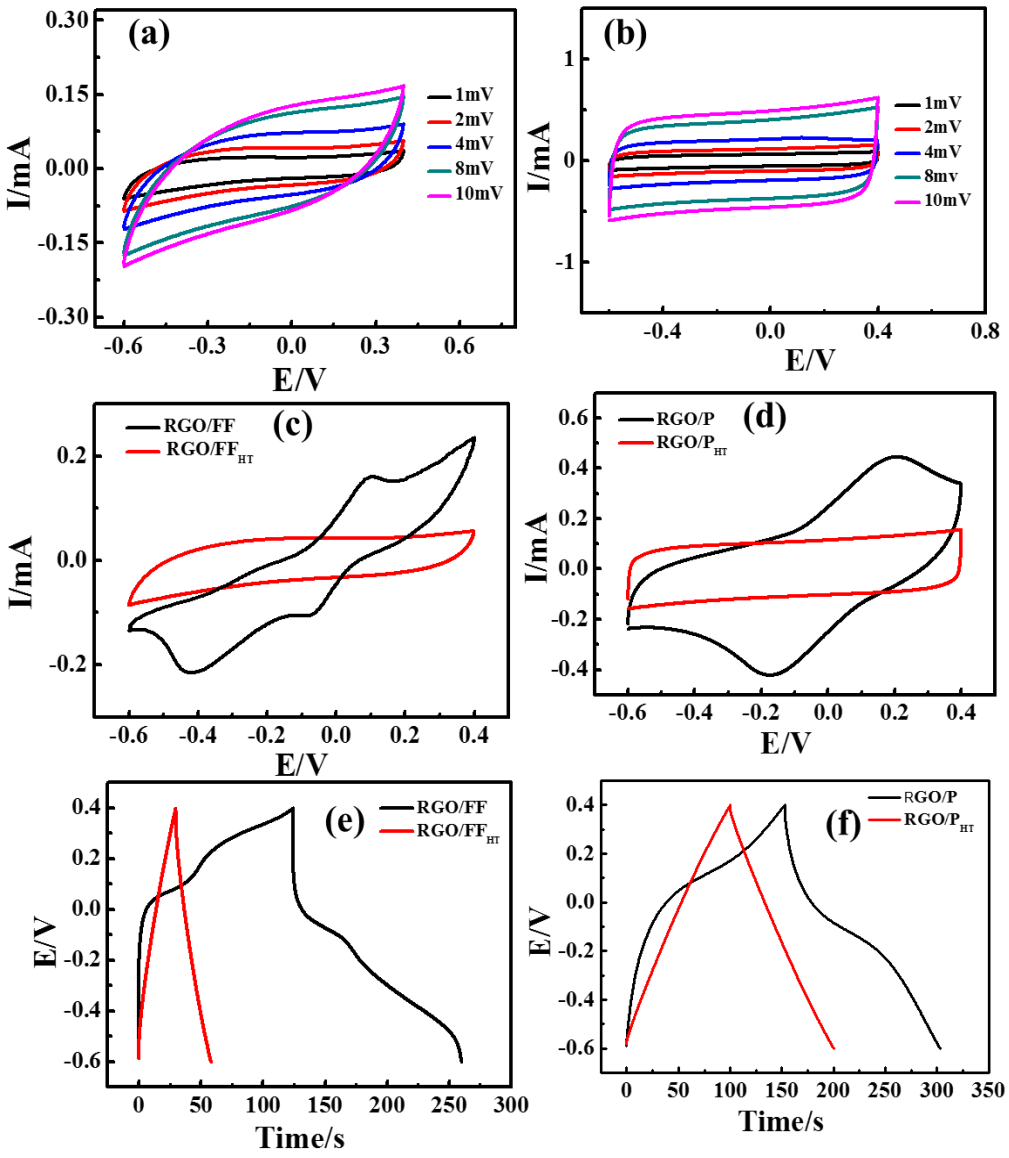

Figure S6. (a) CV curves of hydrazine reduced (a) graphene film and (b) graphene powder at different scan rates rates, (c) Overlap CV plot of HI reduced and hydrazine reduced graphene film, (d) Overlap CV plot of HI reduced and hydrazine reduced graphene powder, (e, f) Overlap GCD plot of HI reduced and hydrazine reduced graphene film and HI reduced and hydrazine reduced graphene powder.