Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A
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Electronic Supplementary Information (ESI) for Halloysite nanotubes@reduced graphene oxide composite for removal of dyes from water and supercapacitors

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Experimental section

Synthesis of graphene oxide. Graphene oxide (GO) was synthesized using the following modified Hummer's method.[S1] Graphite (2 g) was mixed with concentrated H_2SO_4 (69 mL) and the mixture was stirred for 30 min within an ice bath. $KMnO_4$ (8 g) was added very slowly into the dark suspension and the reaction mixture was stirred and sonicated for another 15 min under a reaction temperature of 20 °C. Then the ice bath was removed, and the mixture was stirred at 35 °C overnight. Distilled water was added to the pasty solution under magnetic stirring and the color of the solution turned to yellowish brown. After another 2 h of vigorous stirring, H_2O_2 (30*wt* %, 25 mL) was added and the color turned golden yellow immediately. The mixture was washed with HCl (5 %) for several times and then deionized water until the solution became acid free. The reaction mixture was filtered and dried under vacuum at 65 °C. The GO was obtained as a gray powder and used for the further experimental.

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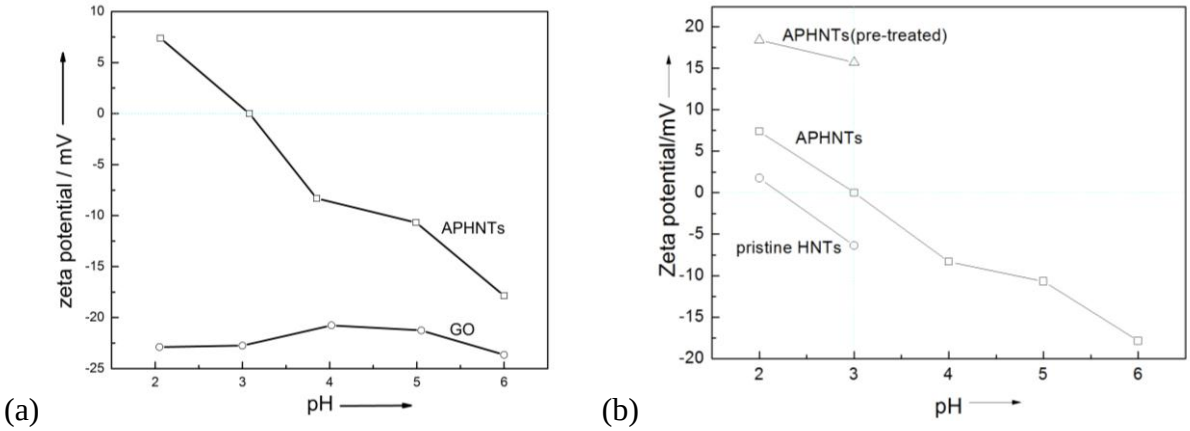


(a) (b)

Figure S1. (a) Zeta potentials of GO and APHNTs; (b) Zeta potentials of pristine HNTs, APHNTS and APHNTs (pre-treated).

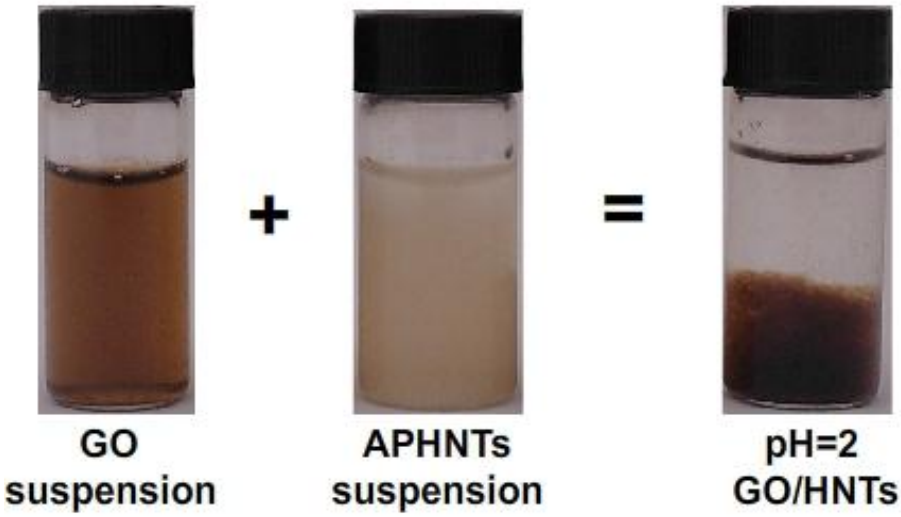
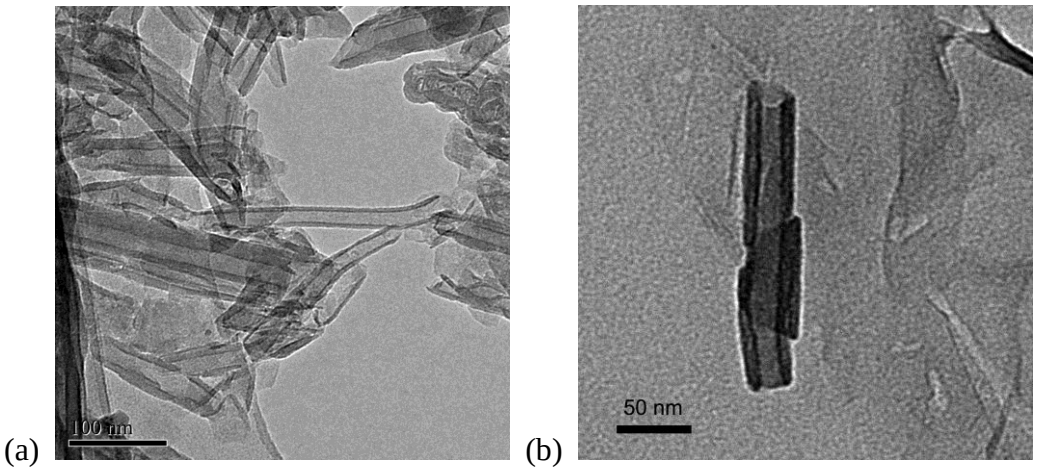


Figure S2. Photo images of APHNTs, GO suspension and GO/HNTs composite.



(a) (b)

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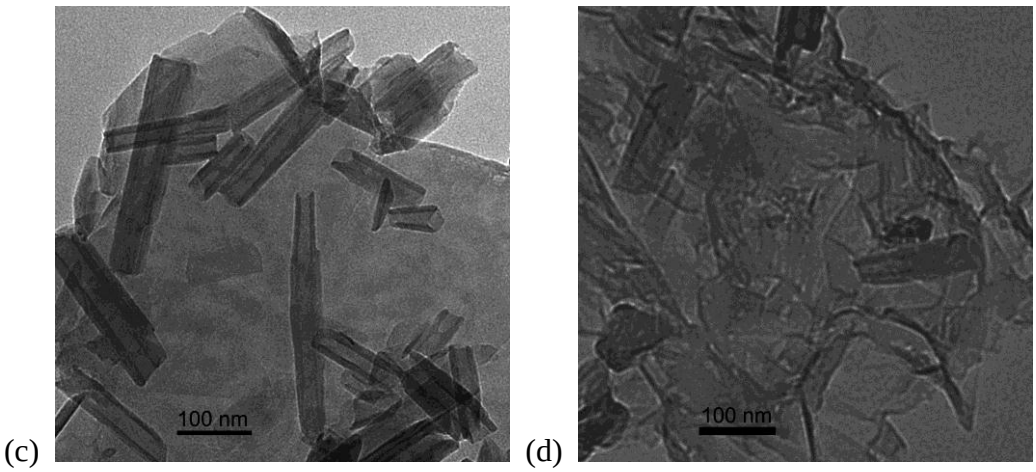

Figure S3. TEM images of (a) HNTs, and (b, c, d) HGC.

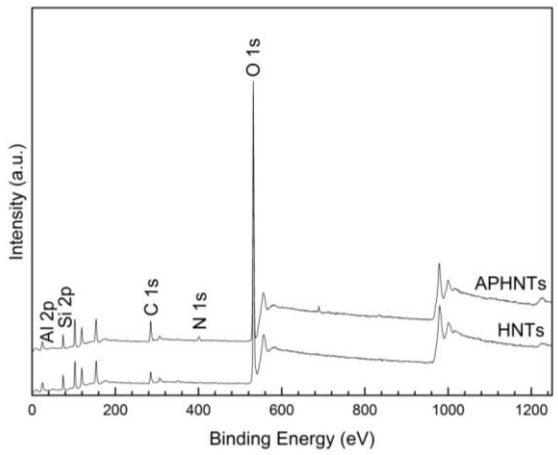

Figure S4. XPS spectra of HNTs and APHNTs.

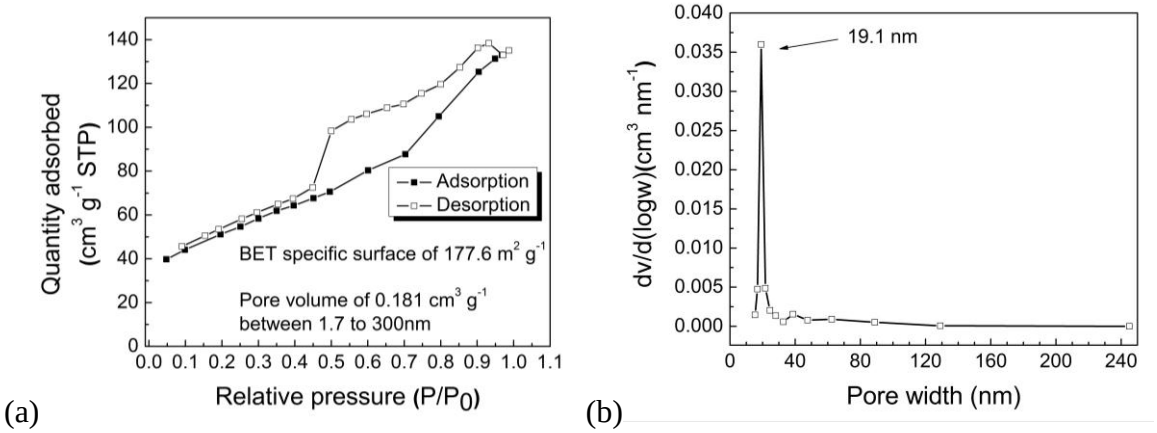

Figure S5. (a) Nitrogen adsorption desorption isotherms at 77K, and (b) pore width distribution of HGC.

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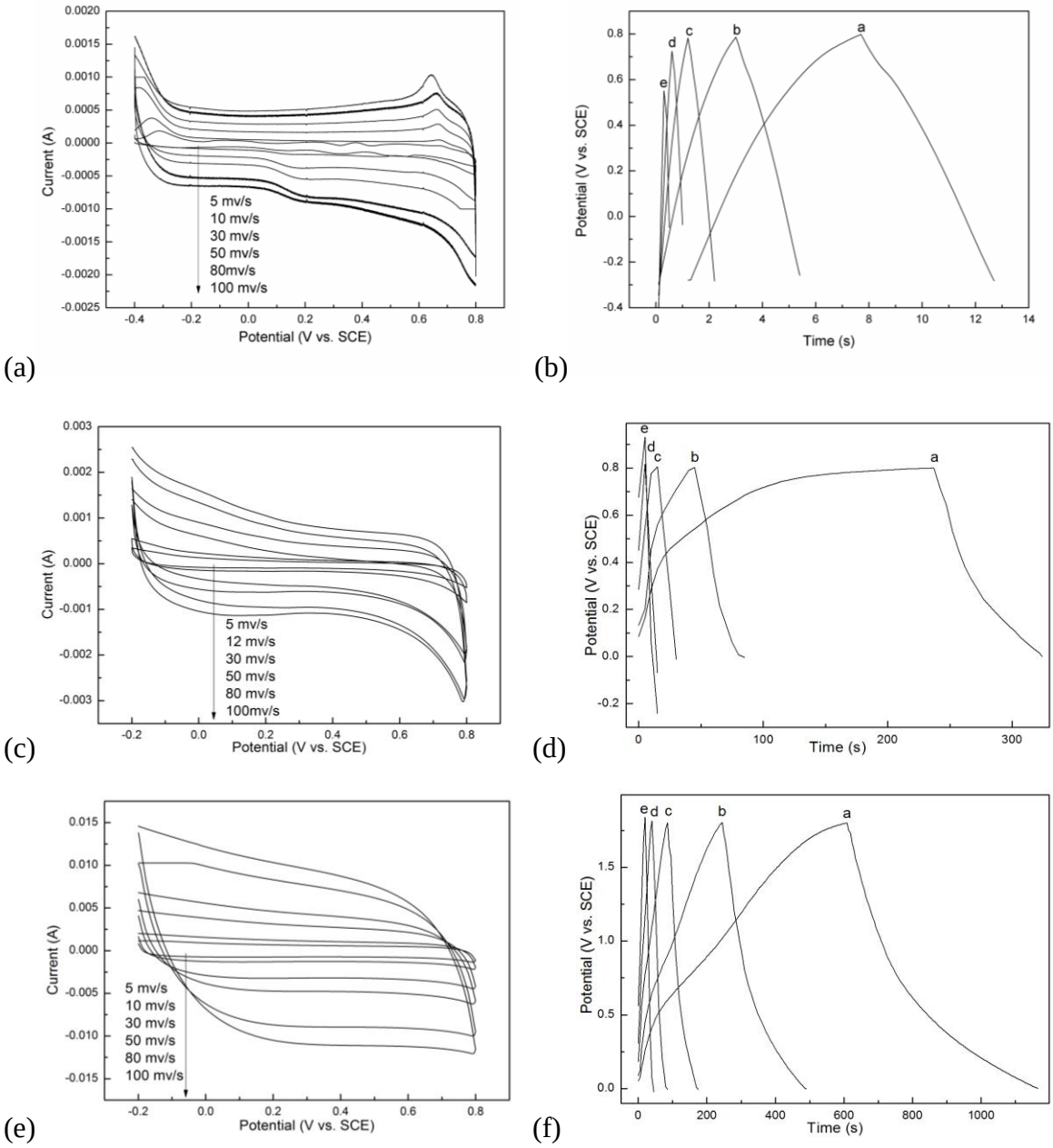

Figure S6. CV curves of (a) HNTs at different potential scan rates from 5 to 100 mV s^{-1}; (b) GCD curves of HNTs at different current densities, a: 100 mA/g, b: 200 mA/g, c: 500 mA/g, d: 1000 mA/g, e: 2000 mA/g; (c) GO at different potential scan rates from 5 to 100 mV s^{-1}; (d) GCD curves of GO at different current densities, a: 100 mA/g, b: 200 mA/g, c: 500 mA/g, d: 1000 mA/g, e: 2000 mA/g; (e) rGO at different potential scan rates from 5 to 100 mV s^{-1}; (f) GCD curves of rGO at different current densities, a: 100 mA/g, b: 200 mA/g, c: 500 mA/g, d: 1000 mA/g, e: 2000 mA/g.

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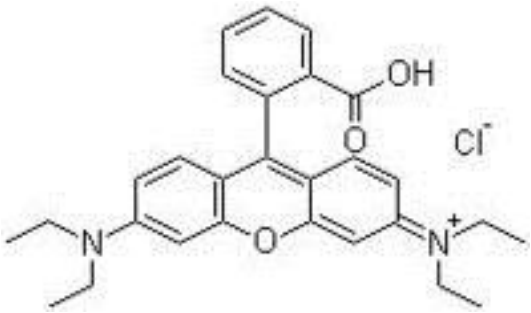

Figure S7. The molecule structure of RhB.

(a) (b) (c)

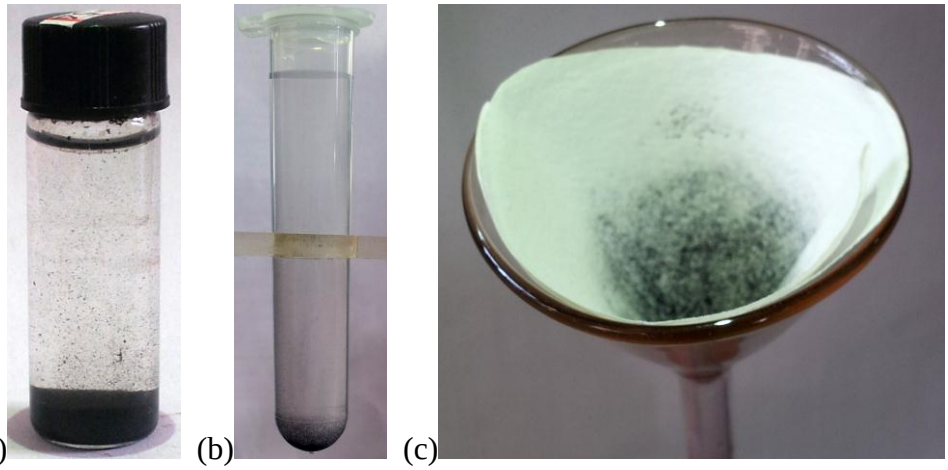

Figure S8. Photographs of different separation process: (a) sedimentation; (b) centrifugation; (c) filtration.

References

S1. W. S. Hummers and R. E. Offeman, *J. Am. Chem. Soc.*, 1958, **80**, 1339–1339.

S2. S. Bose, T. Kuila, Md. E. Uddin, N. H. Kim, A. K.T. Lau, J. H. Lee, *Polymer*, 2010, **51**, 5921–5928.