Supporting Information

Bioinspired Ultrastable Lignin Cathode via Graphene Reconfiguration for Energy Storage

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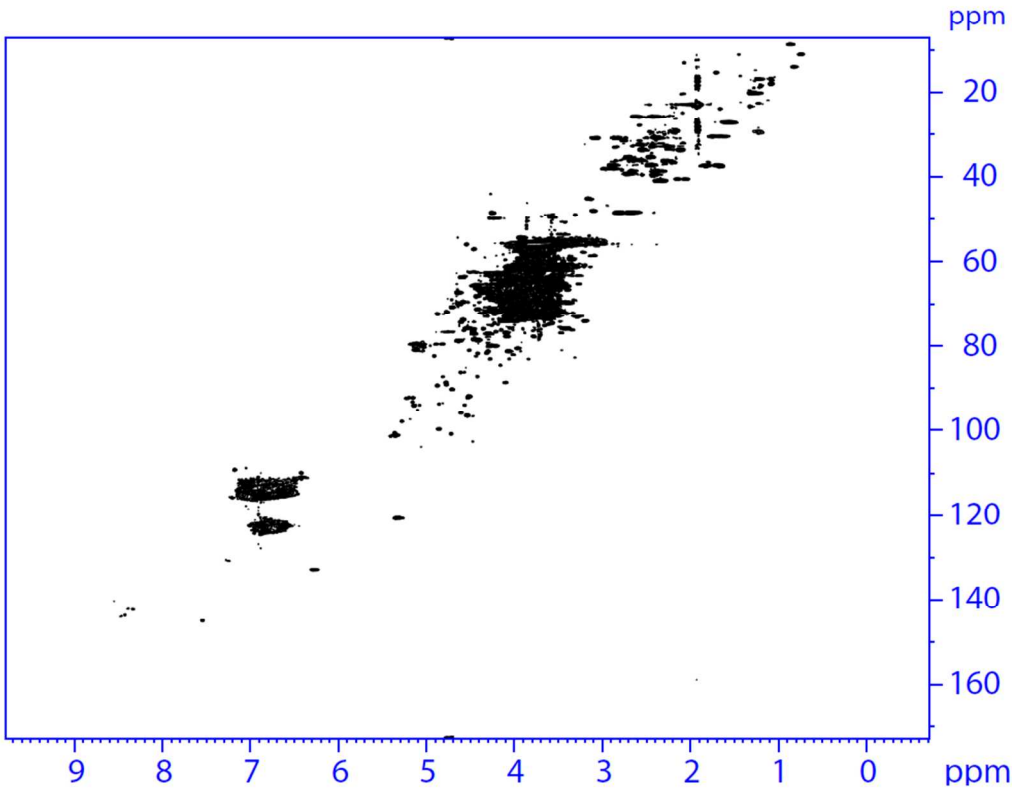
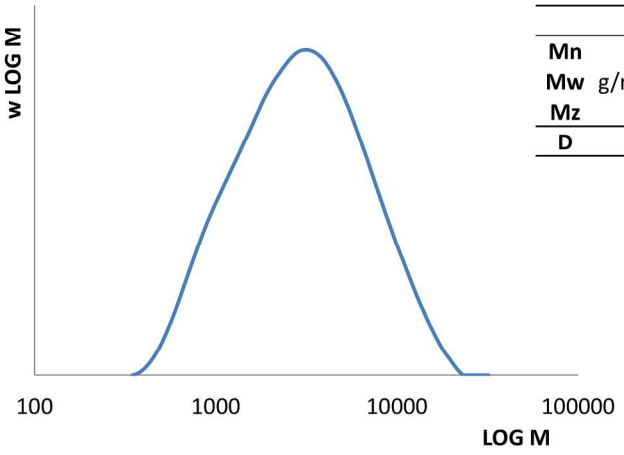


Figure S1. The NMR mapping signal of lignosulfonate.

Table S1 Variations of –OH group content in lignosulfonate according to the NMR test

	Aliphatic -OH	Phenolic	Carboxyl -OH
	(mmol/g)	(mmol/g)	(mmol/g)
Lignosulfonate	3.44	1.05	0.66
Lignosulfonate duplicate	3.47	1.17	0.68

Table S2 Different kinds of molecular weight of lignosulfonate with GPC analysis



		RI signal
Mn		2150
Mw	g/mol	4000
Mz		6750
D		1.87

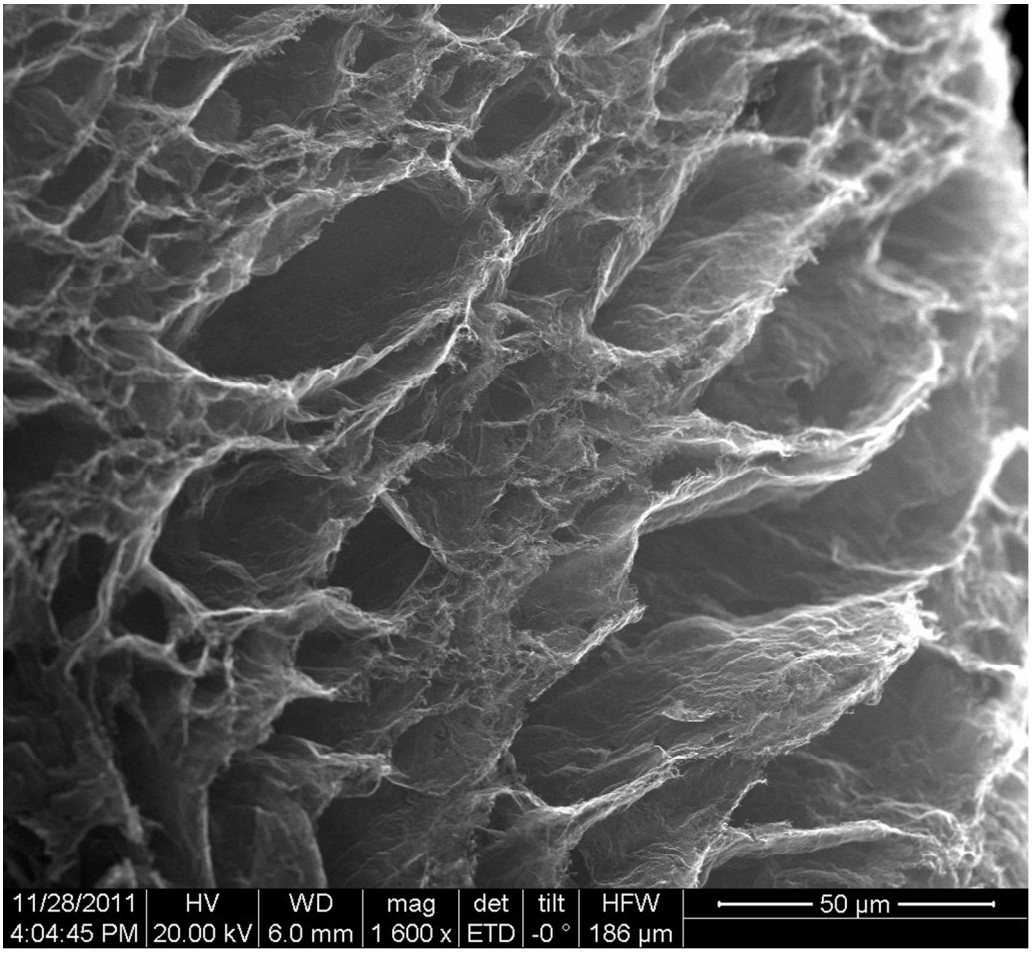


Figure S2 SEM image of graphene flytrap in an open state after freeze drying.

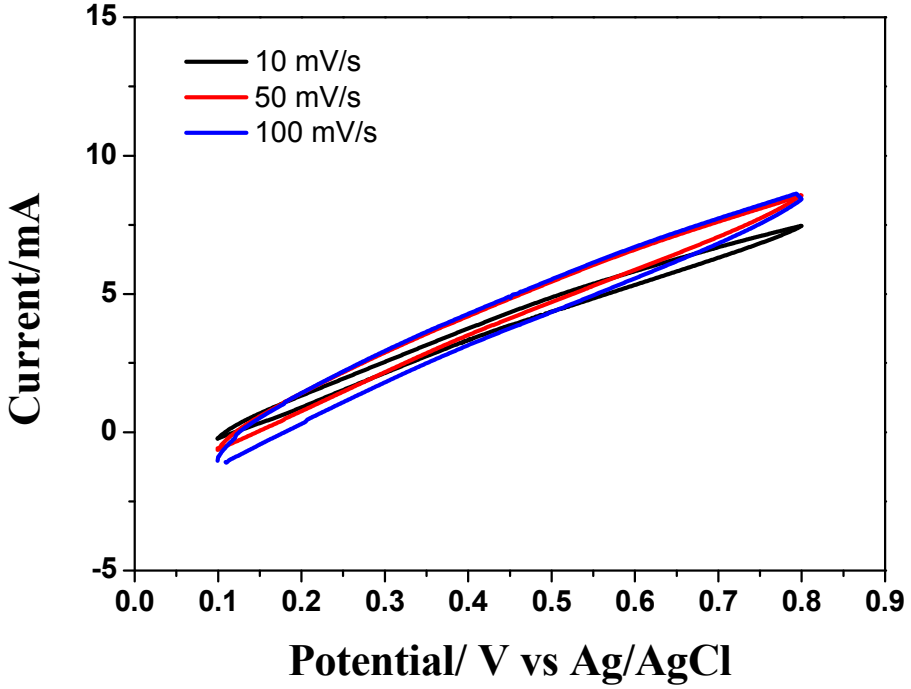


Figure S3 Cyclic voltammetric (CV) profiles of the graphene electrode at different scan rates in 0.1 M $HClO_4$.

Table S3 Variations of specific capacitance with scan rate for the graphene-lignosulphonate and graphene electrode.

Materials	**Specific capacitance (F g^{-1}) at scan rate**		
Lignosulphonate-graphene	138.4 F g^{-1} (20 mV/s)	103.9 F g^{-1} (40 mV/s)	80.3 F g^{-1} (60 mV/s)
Graphene	10.1 F g^{-1} (10 mV/s)	3.1 F g^{-1} (50 mV/s)	1.8 F g^{-1} (100 mV/s)

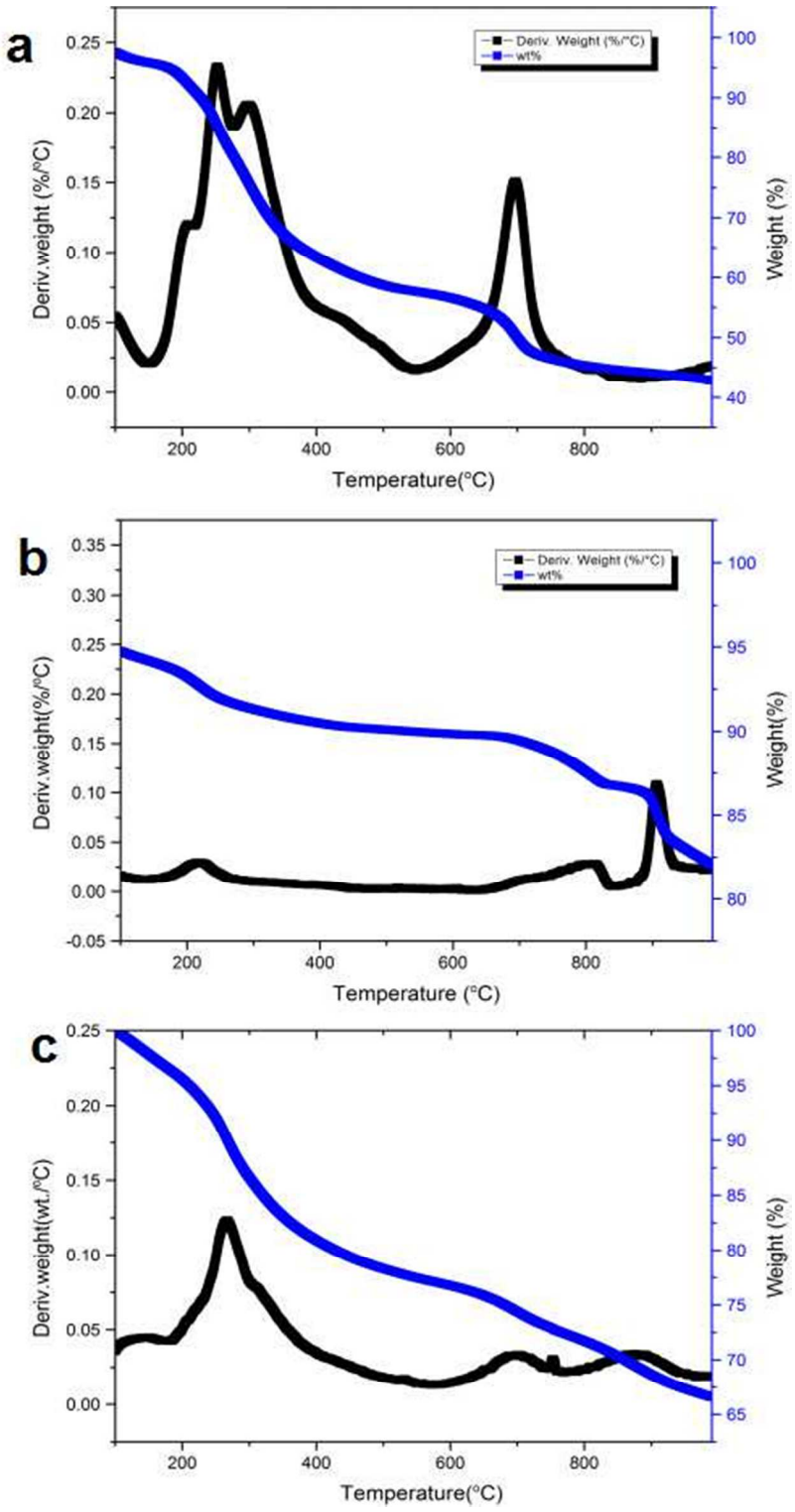


Figure S4 TG-DTA of lignosulphonate (a) graphene (b) and lignosulphonate-graphene hybrid (c).