Electronic Supplementary Material (ESI) for RSC Advances.

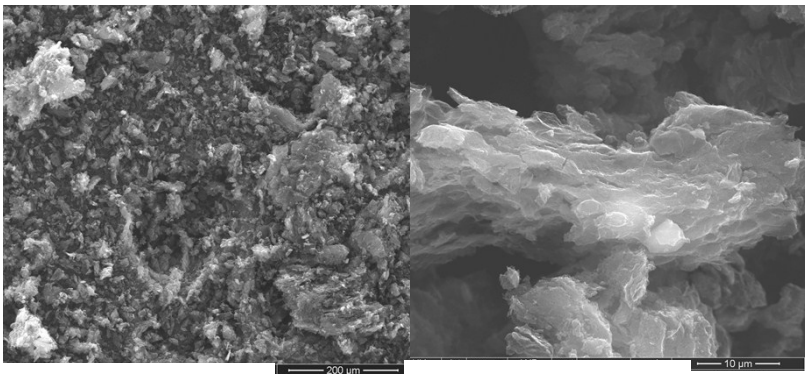
Supplementary Information

Table S1. Chemical characteristics of the pristine carbon nanofibers and functionalized graphene nanoplatelets

Sample	Elemental analysis		XPS								
	C (%)	O (%)	C1s (at.%)	O1s (at.%)	N1s (at.%)	C/O	Csp^2 (%)	Csp^3 (%)	C-O (%)	C=O (%)	OH-C=O (%)
GANF	99.6	0.4	-	-	-	-	-	-	-	-	-
OF1	51.8	36.9	78	21	1	4.0	54.0	16.4	13.5	3.6	11.7
OF2	55.5	38.7	78	22	-	3.6	37.8	35.3	7.6	7.6	10.0

Figure S1. SEM images of the reduced graphene oxides prepared by flash-pyrolysis at 1000ºC

rGO1-1000



rGO2-1000

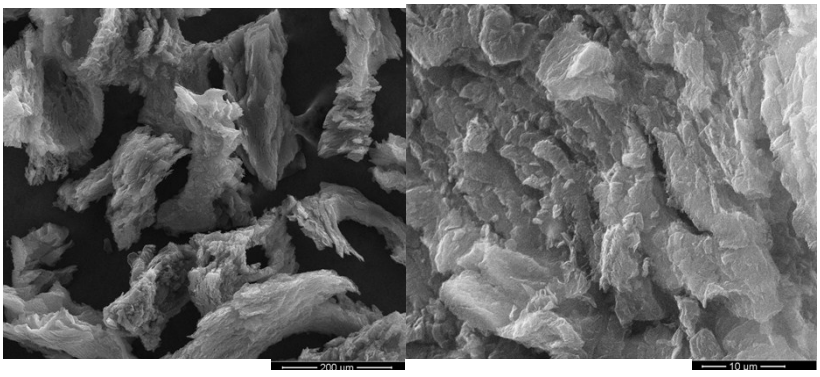


Figure S2. TEM images of diverse graphene-related materials

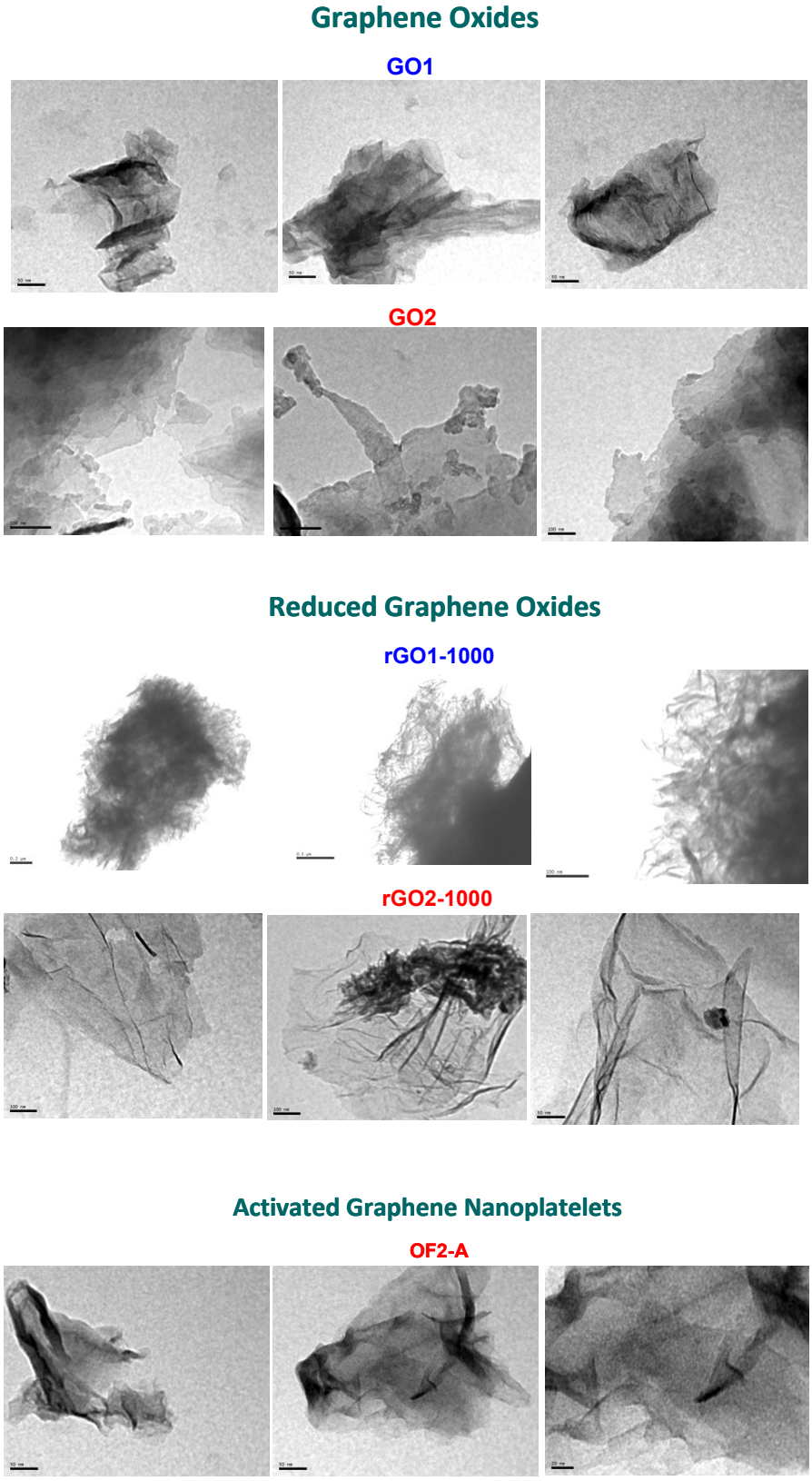


Figure S3. Galvanostatic charge-discharge cycles at 1 A/g (20 mA/cm^2) for the different graphene-related materials

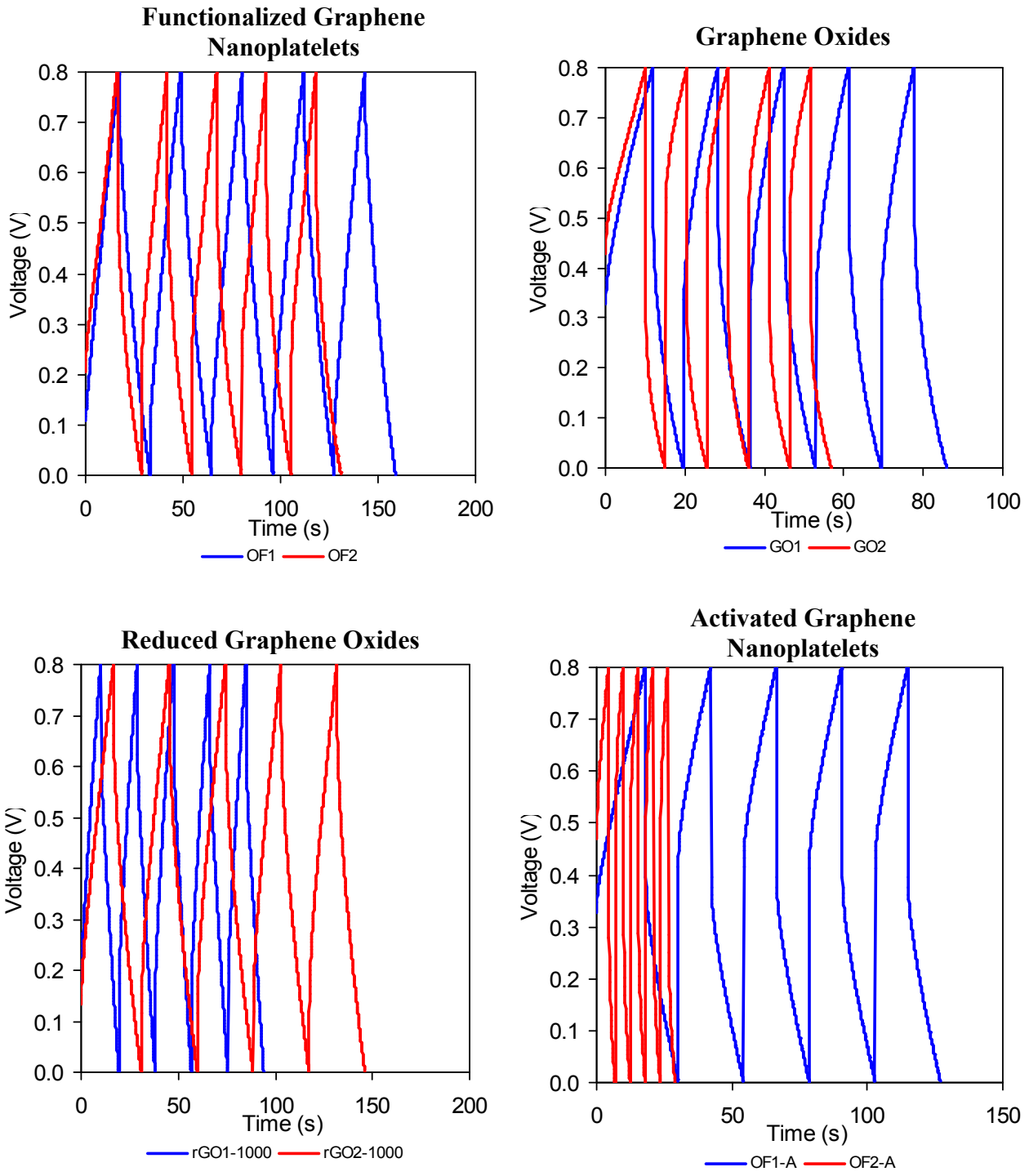


Table S2. Specific capacitance obtained from galvanostatic charge-discharge tests (after 200 cycles) and cyclic voltammetry

	Intensity (mA/cm^2)	OF1	OF2	GO1	GO2	rGO1-1000	rGO2-1000	OF1-A	OF2-A
Galvanostatic charge-discharge cycles	1	82	118	105	120	42	80	100	69
	3	75	104	91	101	39	76	96	60
	5	71	94	76	85	38	74	94	53
	7	69	87	68	70	37	72	92	46
	10	66	79	55	60	36	69	89	34
	20	59	62	40	46	33	59	75	10
	30	54	51	32	30	31	50	53	-
	50	48	31	17	-	26	37	20	-
	70	44	-	-	-	22	30	-	-
	100	40	-	-	-	18	-	-	-
	Scan rate mV/s)	OF1	OF2	GO1	GO2	rGO1-1000	rGO2-1000	OF1-A	OF2-A
Cyclic Voltammetry	1	83	104	107	116	46	79	98	65
	2	79	93	94	97	43	76	92	59
	5	70	76	74	69	38	70	79	45
	10	64	62	52	48	35	63	64	30
	20	56	47	34	30	31	53	42	17
	50	44	28	17	12	25	36	16	6

The capacitance *C* was determined by galvanostatic charge–discharge voltage cycles from 0 to 0.8V at different current densities ranging from 1 to 100 mA/cm^2 of electrode surface. The specific capacitance *C* (F/g) of a single electrode has been calculated by using the equation

$$C = 2\, I\, t_d / m_c\, V_d,$$

where I is the current density, t_d the time spent during the discharge, V_d the voltage decrease in the discharge and m_c is the weight of carbon loaded in the composite electrode (M.D. Stoller and R.S. Ruoff, *Energy Environ. Sci.*, 2010, **3**, 1294).

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