Electronic Supplementary Material (ESI) for RSC Advances.

Support Information

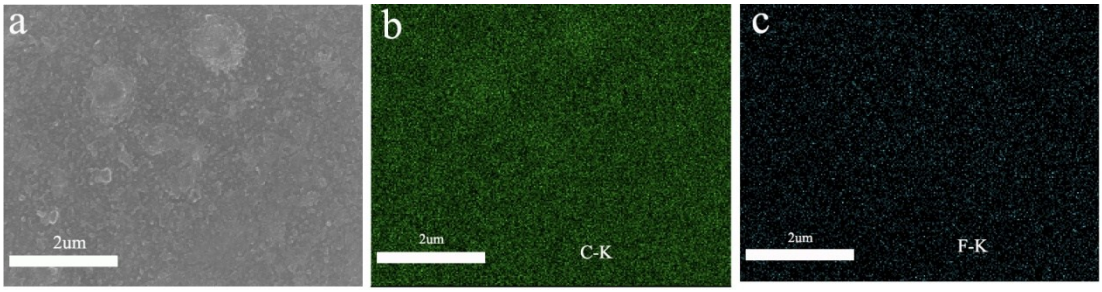

Fig. S1. SEM and EDS elemental mapping images of the F doped GDY film.

Table S1. Elemental content of F doped GDY from EDX.

Element	Weight ratio (%)	Atom ratio (%)
C K	82.26	88.00
F K	17.74	12.00
total	100.00	100.00

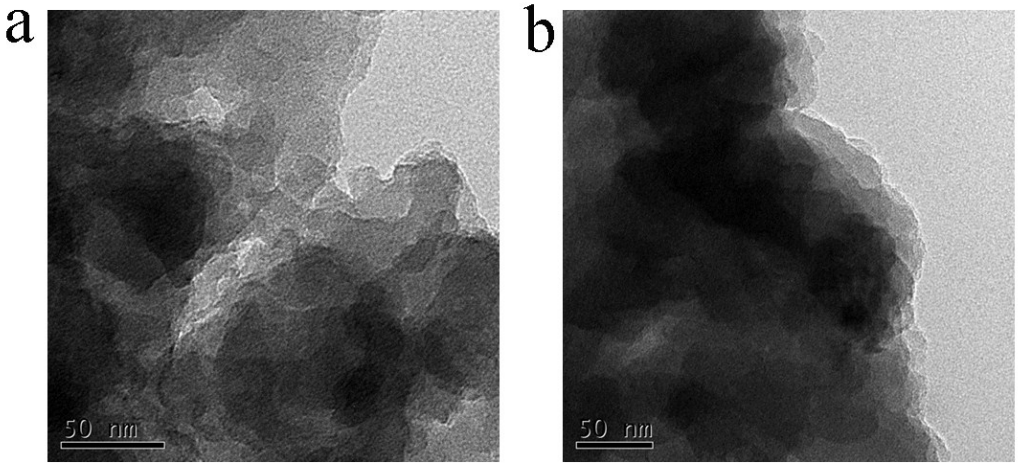

Fig. S2. TEM image, a is GDY, and b is F doped GDY.

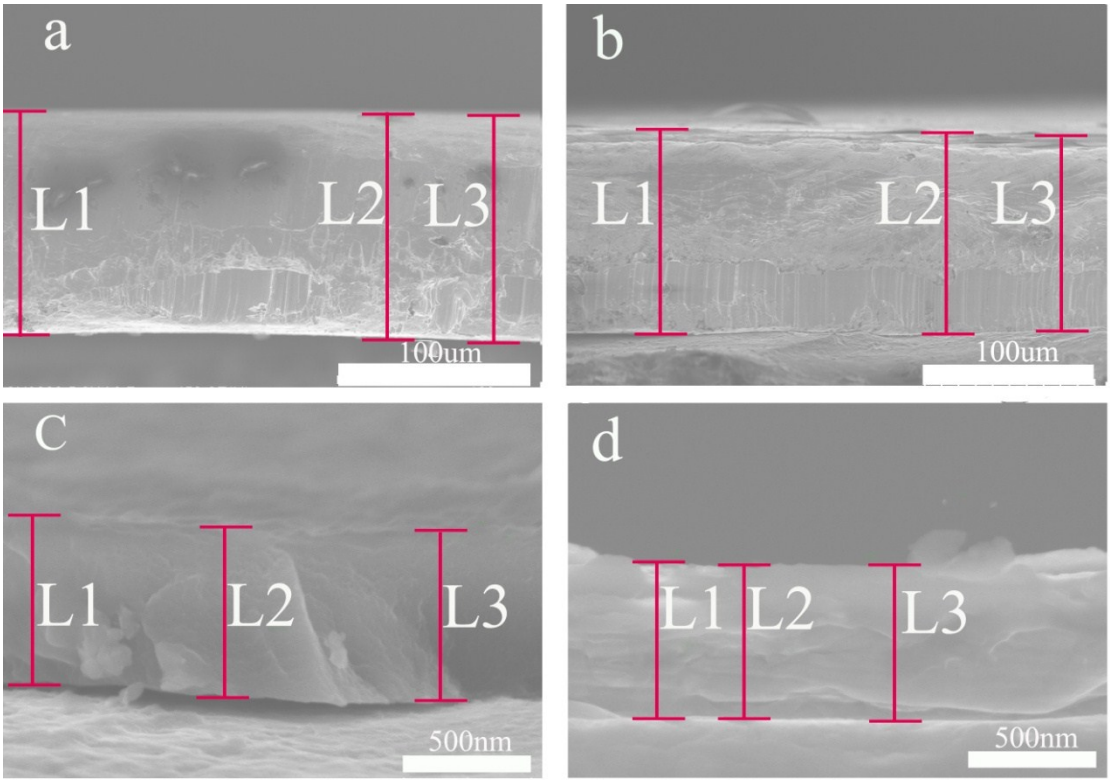

Fig. S3. (a) cross-sectional SEM images of (a) Cu, (b) Cu when GDY is synthesized, (C) GDY and (d) F doped GDY.

Table. S2 shows the thickness of the GDY and F doped GDY films are 678 nm and 610 nm, respectively. The copper consumption of the synthetic GDY process was 78 nm calculate from SEM cross-section. The density of GDY and F doped GDY are 1323.9 and 2386.6 mg/cm^3, respectively. The electrodes of GDY and F doped GDY have a diameter of 1.2 cm. The weight of GDY and F doped GDY were calculated by $m = \rho V$, list in the Table S2.

Table S2. The thickness and weight of the sample.

	L1	L2	L3	Average	Single electrodes weight
Cu	115 um	117 um	116 um	116 .0um	-
Cu+GDY	118 um	117 um	115 um	116.6 um	-
GDY	680 nm	674 nm	680 nm	678.0 nm	0.10 mg
F doped GDY	615 nm	605 nm	610nm	610.0nm	0.16 mg

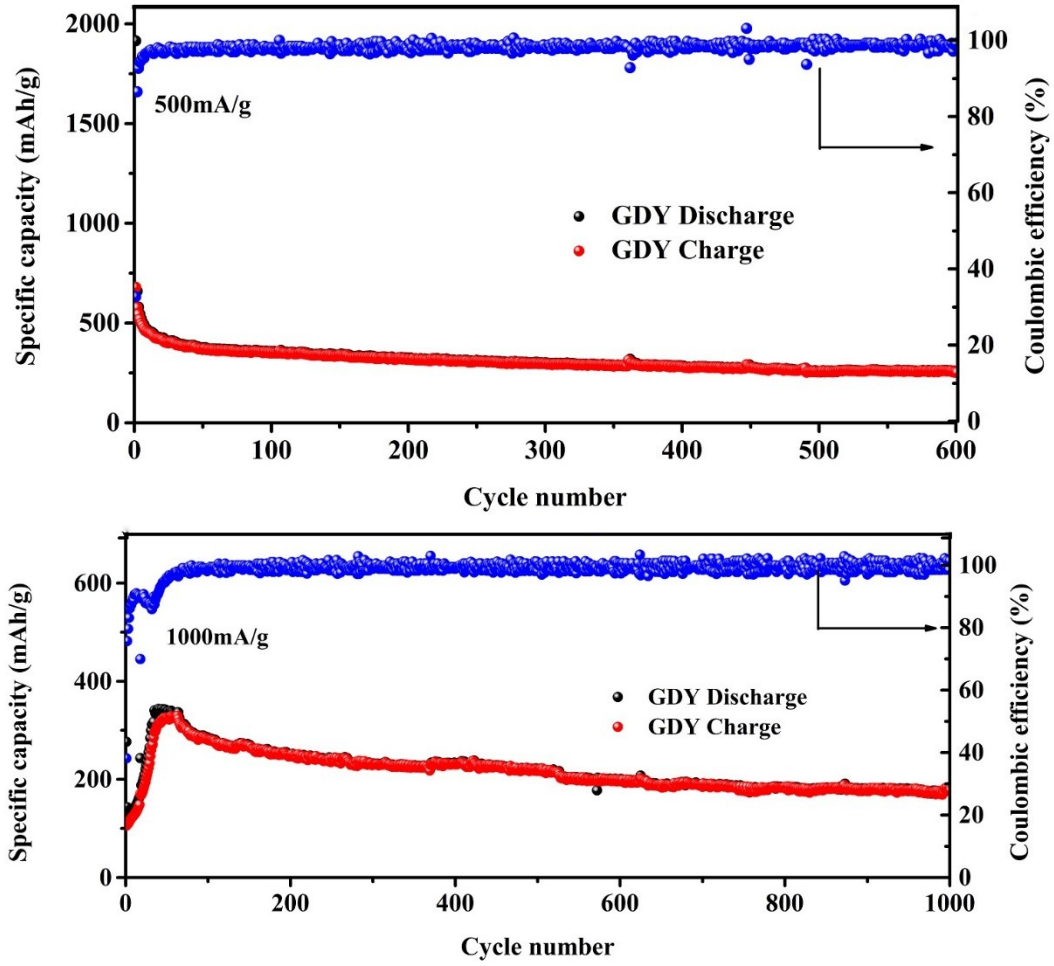

Fig. S4. The coulombic efficiency of GDY at a current density of 500 mA/g and 1000 mA/g.

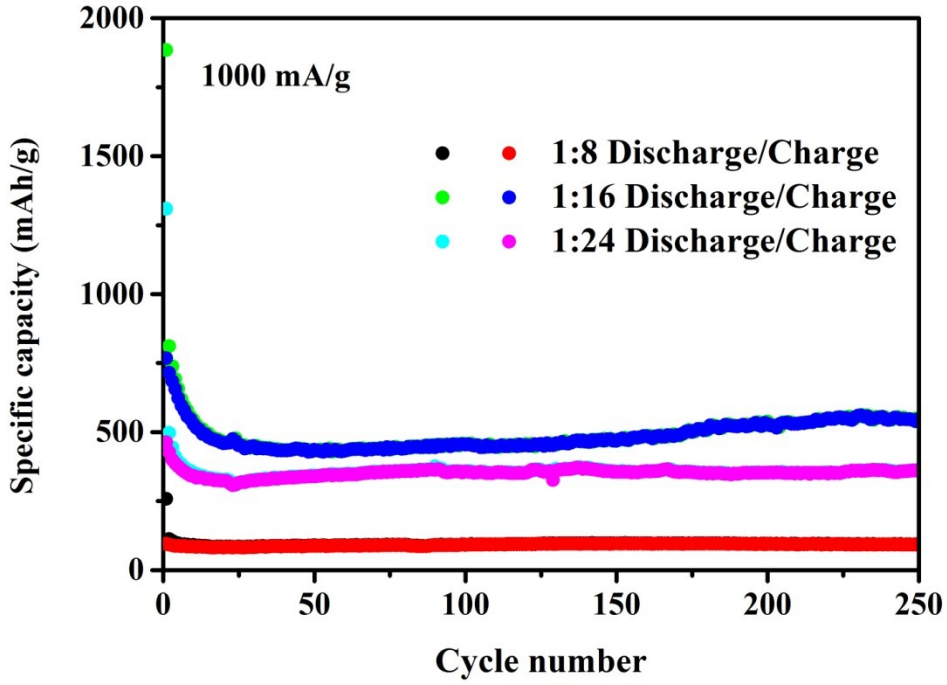

Fig. S5.Cycling performance of F-GDY under different concentrations of fluorine doped .