Supporting Information for

Fast Preparation of Controllable Nitrogen Atoms Substituted Graphyne film Applied for FET Devices

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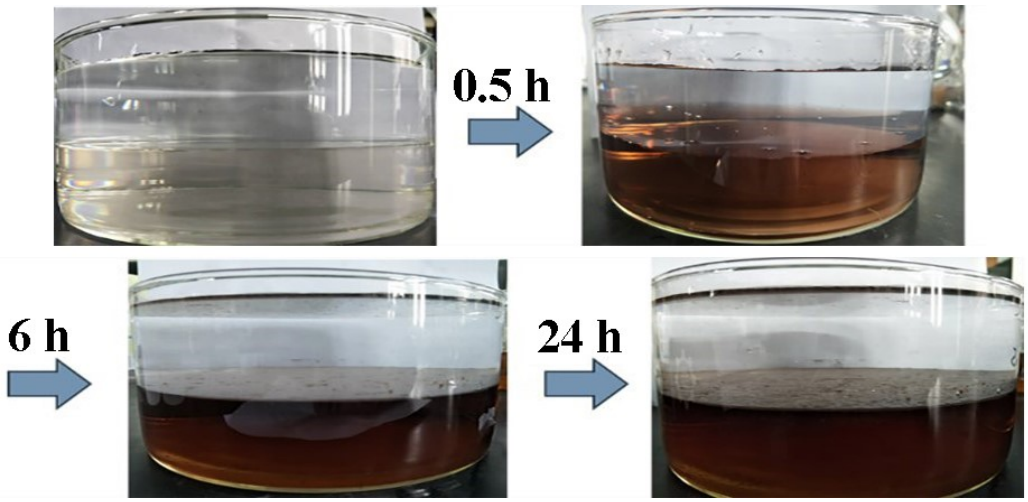

Fig. S1. The photographs of the interface at different reaction moments.

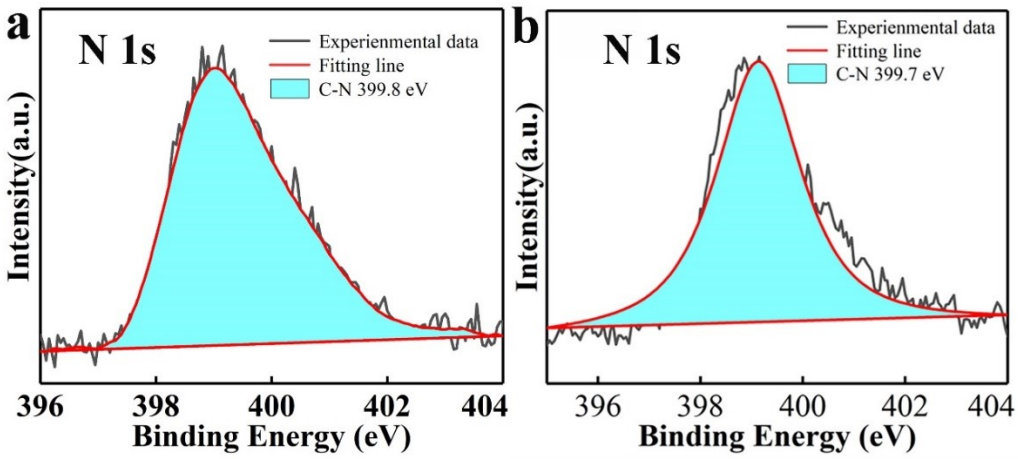

Fig. S2. XPS spectra of PM-GY. Narrow scans for element C (a) and N (b).

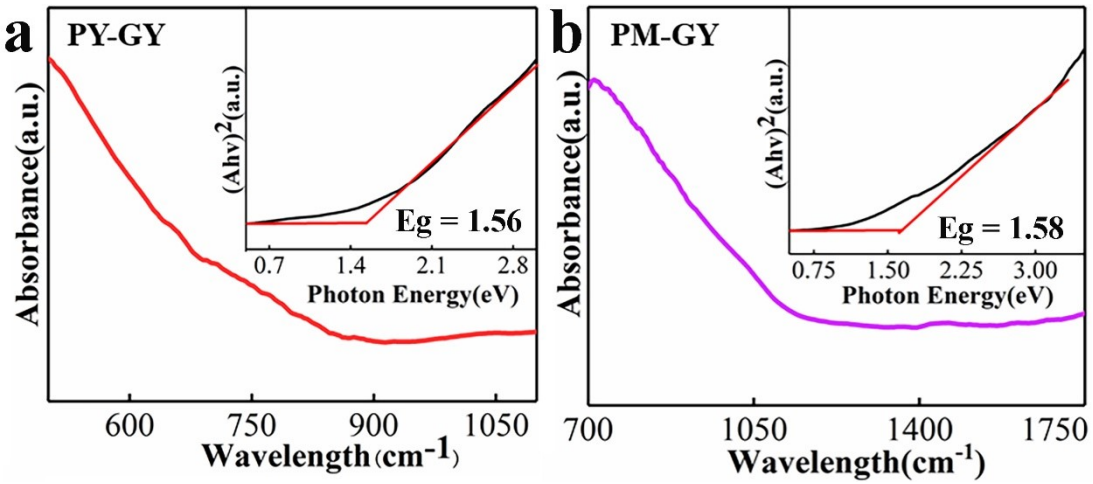

Fig. S3. UV-vis absorption spectrum of PY-GY (a), PM-GY (b).

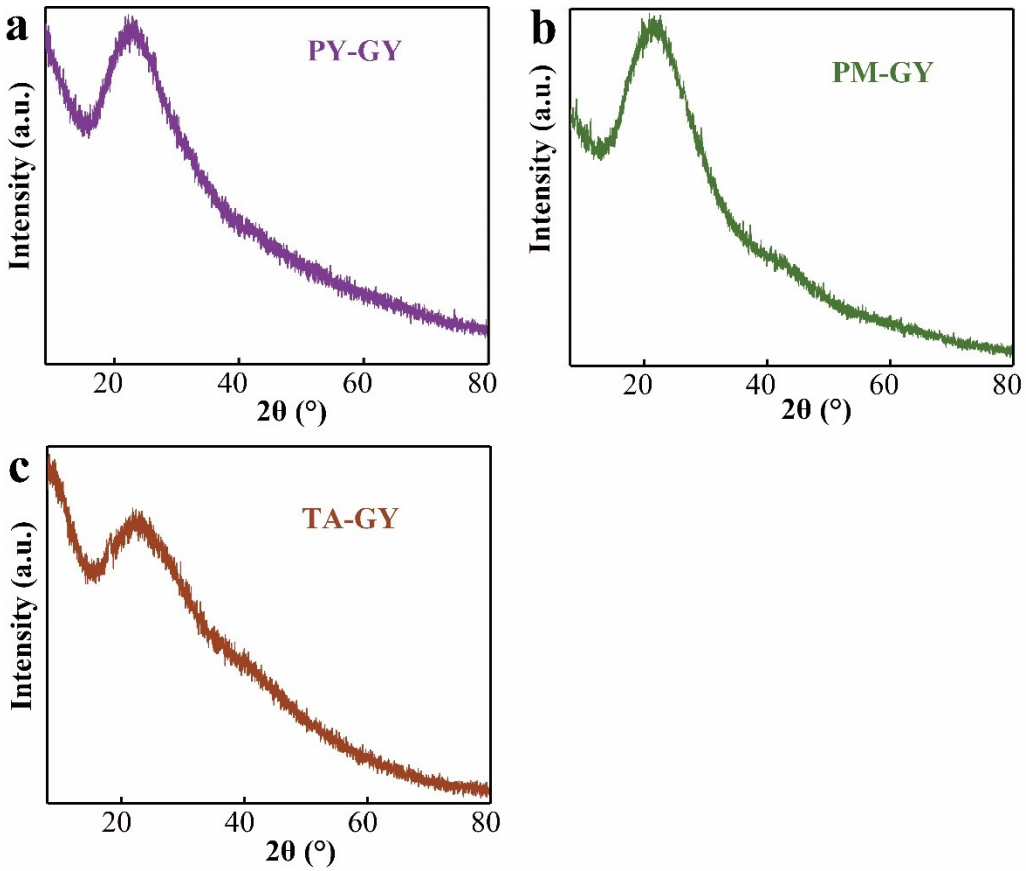

Fig. S4. XRD patterns of the as-prepared N-GYs.

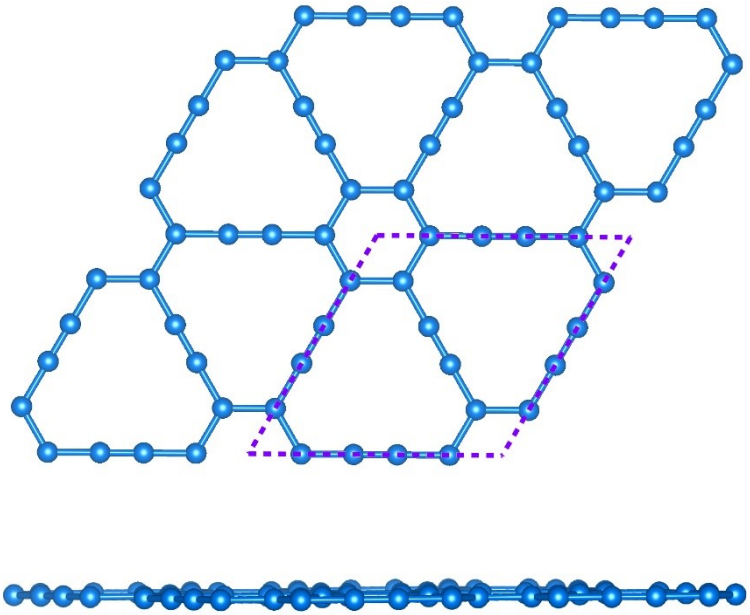

Fig. S5. The optimized repeating unit of GY from top and cross-section view.

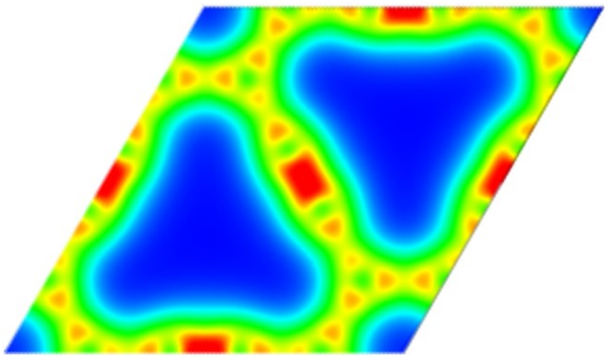

Fig. S6. Simulated charge density graphs of GY.

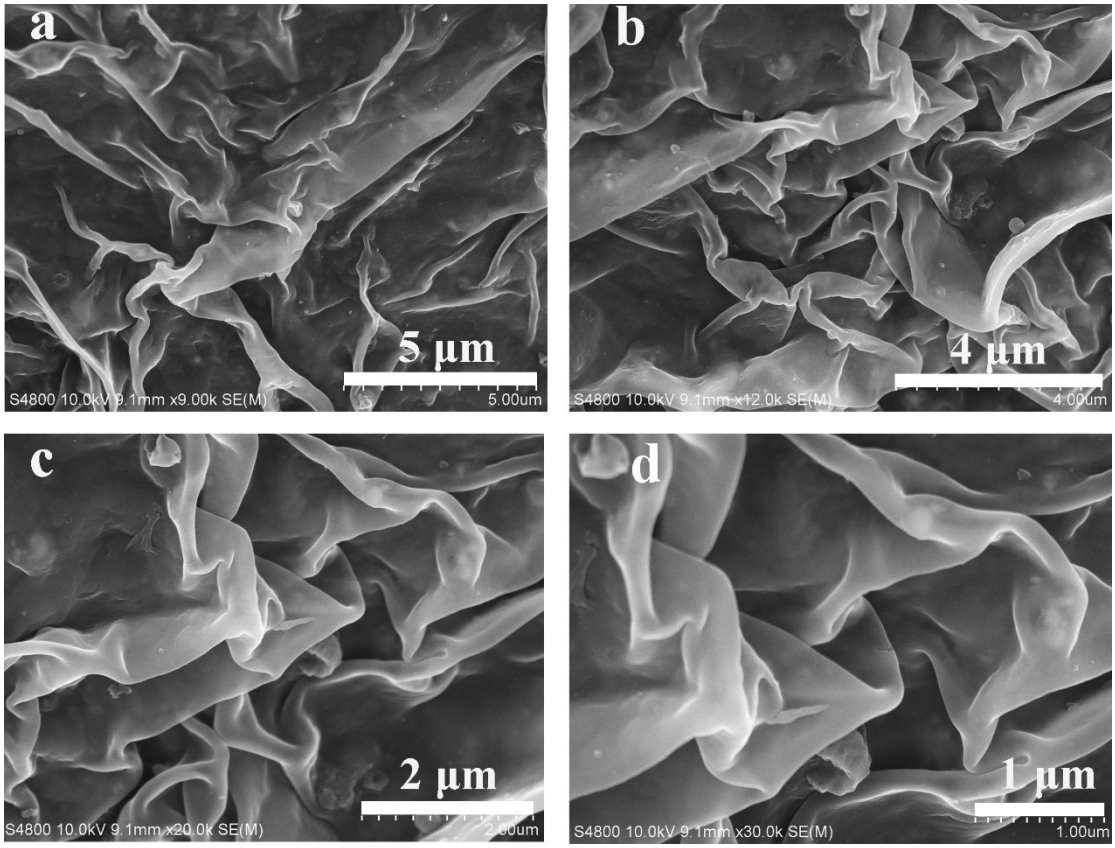

Fig. S7. SEM images of HsGY films from top and expanded view.

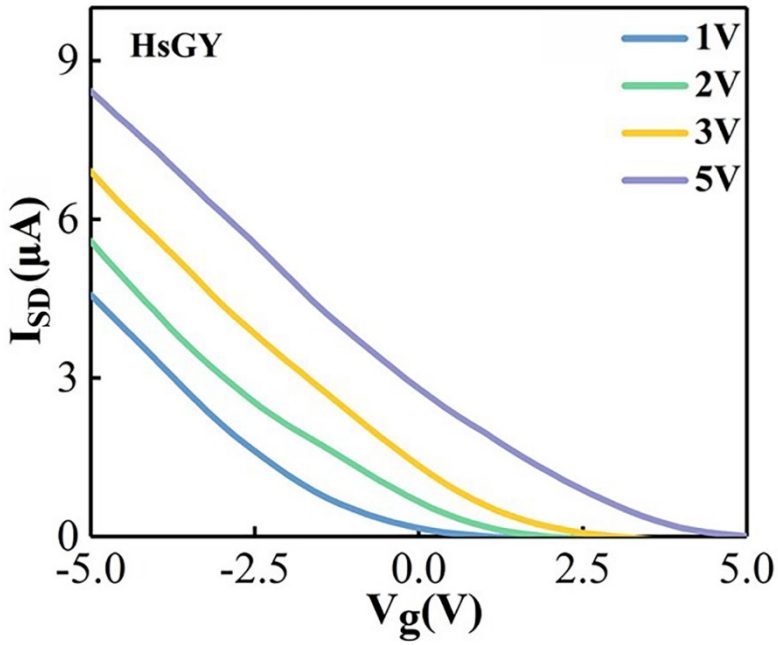

Fig. S8. The transfer I_{SD}-V_G curves for the as-prepared HsGY films.

Table S1. The elemental analysis for C and N in N-GYs.

Name	N% (weight)	C% (weight)	C/N (weight)	N/(N+C) (atomic)
PY-GY	11.86	82.32	6.94	0.99/9
PM-GY	22.90	72.18	3.15	1.92/9
TA-GY	34.29	59.67	1.74	2.97/9

Table S2 Comprehensive comparison of the mobility of carbon materials.

Carbon materials	Mobility ($cm^2 V^{-1} s^{-1}$)	Reference
TA-GY	**9.8**	**This work**
GDY/PFC	0.69	Ref.[1]
C-N-PDTs	1.8	Ref.[2]
GNRs	0.41	Ref.[3]
Es-PG_4	1.82	Ref.[4]
CNT	5	Ref.[5]
GDY/HBN	6.3	Ref.[6]
r-GO	6.3	Ref.[7]
SWNTS	6.68	Ref.[8]
B-CNTS	7.2	Ref.[9]

GDY, Graphdiyne; PFC, P-o-FBDTP-C8DTBTff, HBN, Hexagonal boron nitride; C-N-PDTs, 2,9-Dialkylated phenanthro [1,2-b:8,7-b'] dithiophene derivatives; GNRs, Graphenenanoribbons; Es-PG_4, Electrospun nanofiber; CNT, Carbon nanotubes; B-CNT, Boron-doped carbon nanotubes; r-GO: Reduced graphene oxide; SWNTS, Semiconducting single-walled carbon nanotubes.

References

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