

Supplementary Information(SI)

FIG S1. Phonon spectra for nine representative graphene networks. (a-c) are those of TGN(2,1), TGN(2,2), and TGN(2,3);(d-f) are those of QGN(1,2), TGN(2,2), and TGN(2,4); and (g-i) are those of HGN(1,3), HGN(2,2), and HGN(2,4), respectively.

FIG S2. The effect of external strains on the Dirac surfaces of QGN(1,2). (a-b) The models under uniaxial and biaxial strains, respectively. (c-d) Schematic views of the shifting of Dirac surfaces under uniaxial and biaxial strains, respectively.

Table S1. Independent elastic constants for nine representative graphene networks, diamond, and graphite.

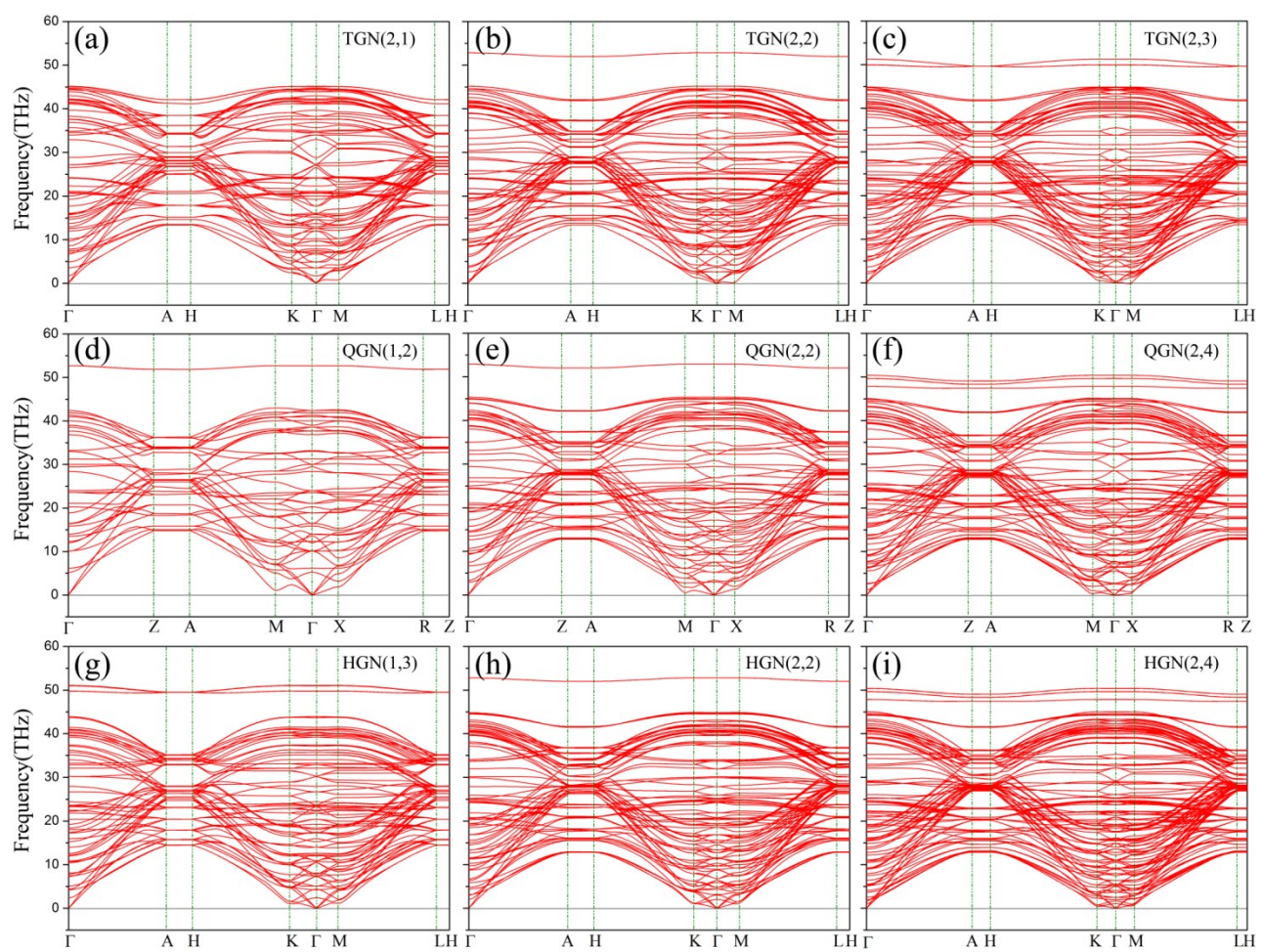


FIG S1

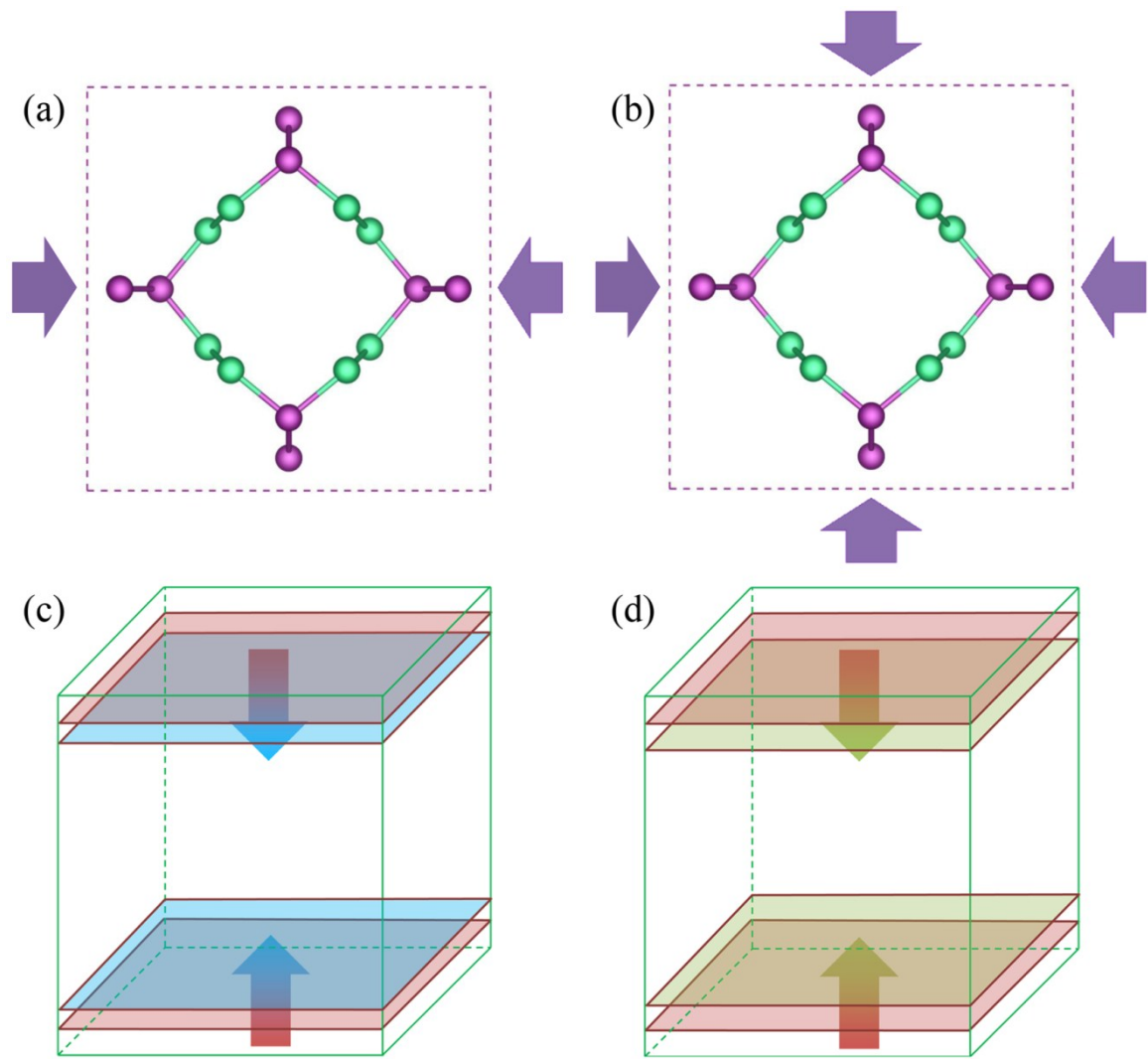


FIG S2

Table S1

SYSTEM	m	n	C11	C33	C44	C66	C12	C13	Bulk Moduli	Shear Moduli
TGN	2	1	275.06	773.19	168.1	95.2	84.66	47.88	173.33	148.78
	2	2	142.67	538.66	109.74	23.35	107.17	32.42	120.2	63.73
	2	3	106.43	418.77	85.62	8.45	89.54	26.57	94.44	43.6
QGN	1	2	282.2	811.84	177.65	32.51	174.35	53.97	205.67	114.24
	2	2	205.55	681.19	145.64	40.16	169.78	48.98	171.79	85.91
	2	4	136.61	471.42	100.58	2.02	117.79	35.44	117.95	42.84
HGN	1	3	234.15	764.05	152.77	21.73	190.7	45.99	190.42	87.34
	2	2	183.27	686.91	135.74	14.21	154.84	45.76	160.48	71.1
	2	4	149.75	554.8	112.94	9.82	130.11	38.38	132.07	56.17
Diamond			1048.7			560.56	124.07		432.28	518.95
Graphite			1060	36.5	4	440	180		35.4	4.9