Electronic Supplementary Information for

Two-Dimensional Carbon Materials with Anisotropic Dirac Cone: High Stability and Tunable Fermi Velocity

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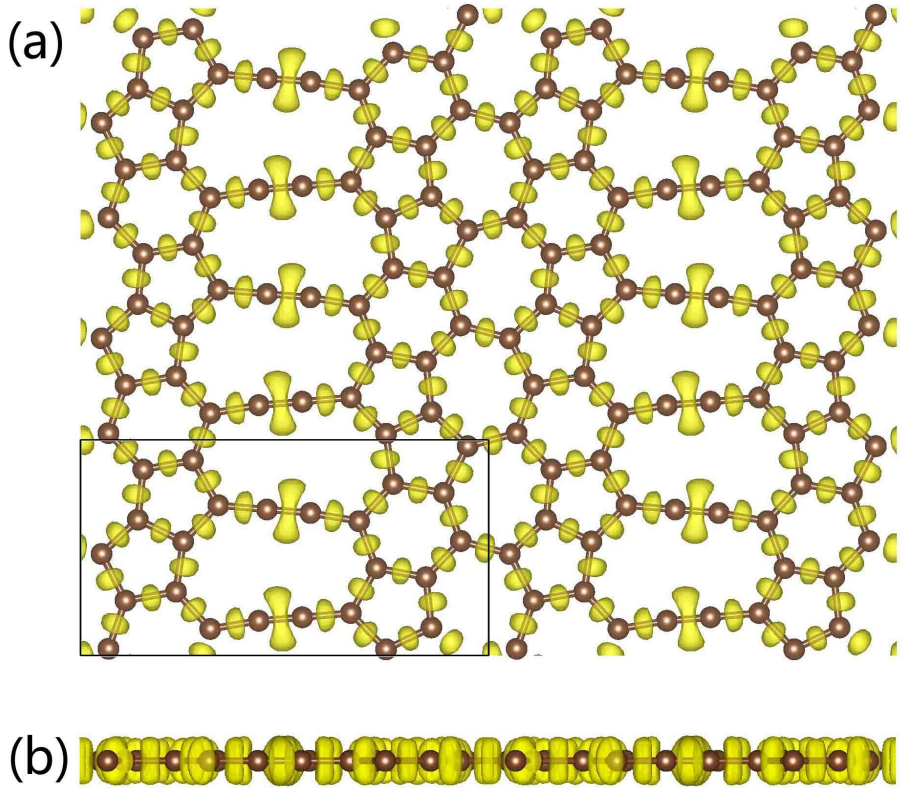

Fig. S1 The (a) top and (b) side view of the calculated ELF isosurface of 2D $Pmc2_1$ at isosurface=0.8.

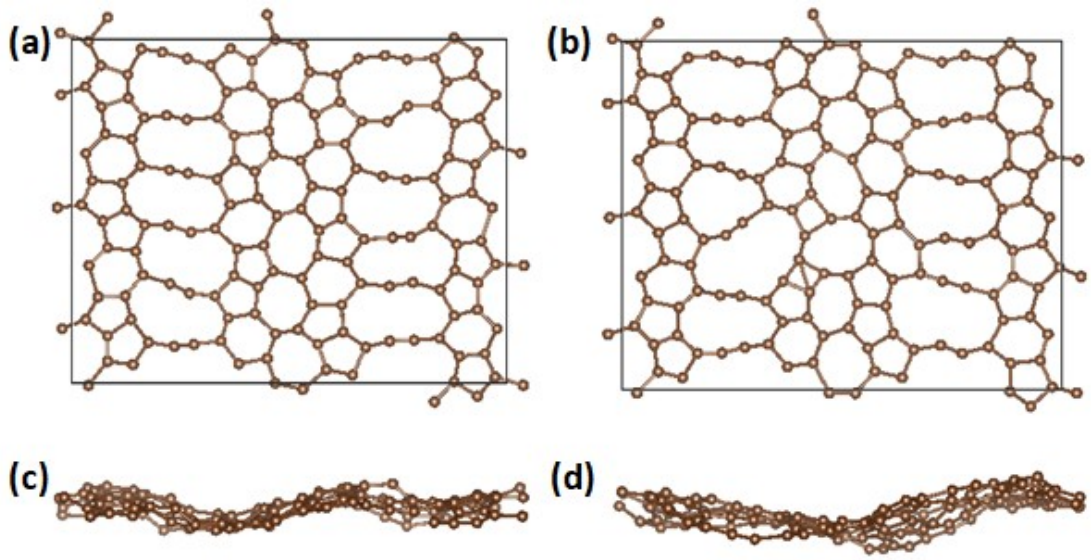

Fig. S2 Equilibrium structures of $Pmc2_1$ at (c) 3000 and (d) 3500 K after AIMD simulations at 8000 fs.

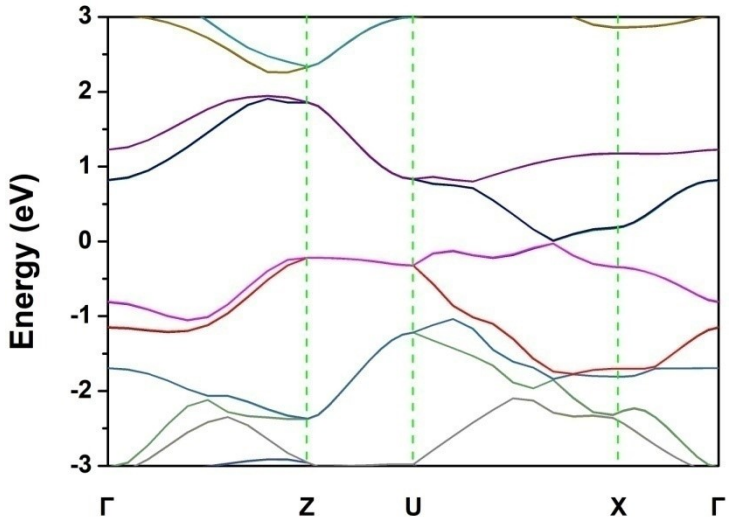

Fig. S3 Band structures of $Pmc2_1$ by using the HSE + SOC method

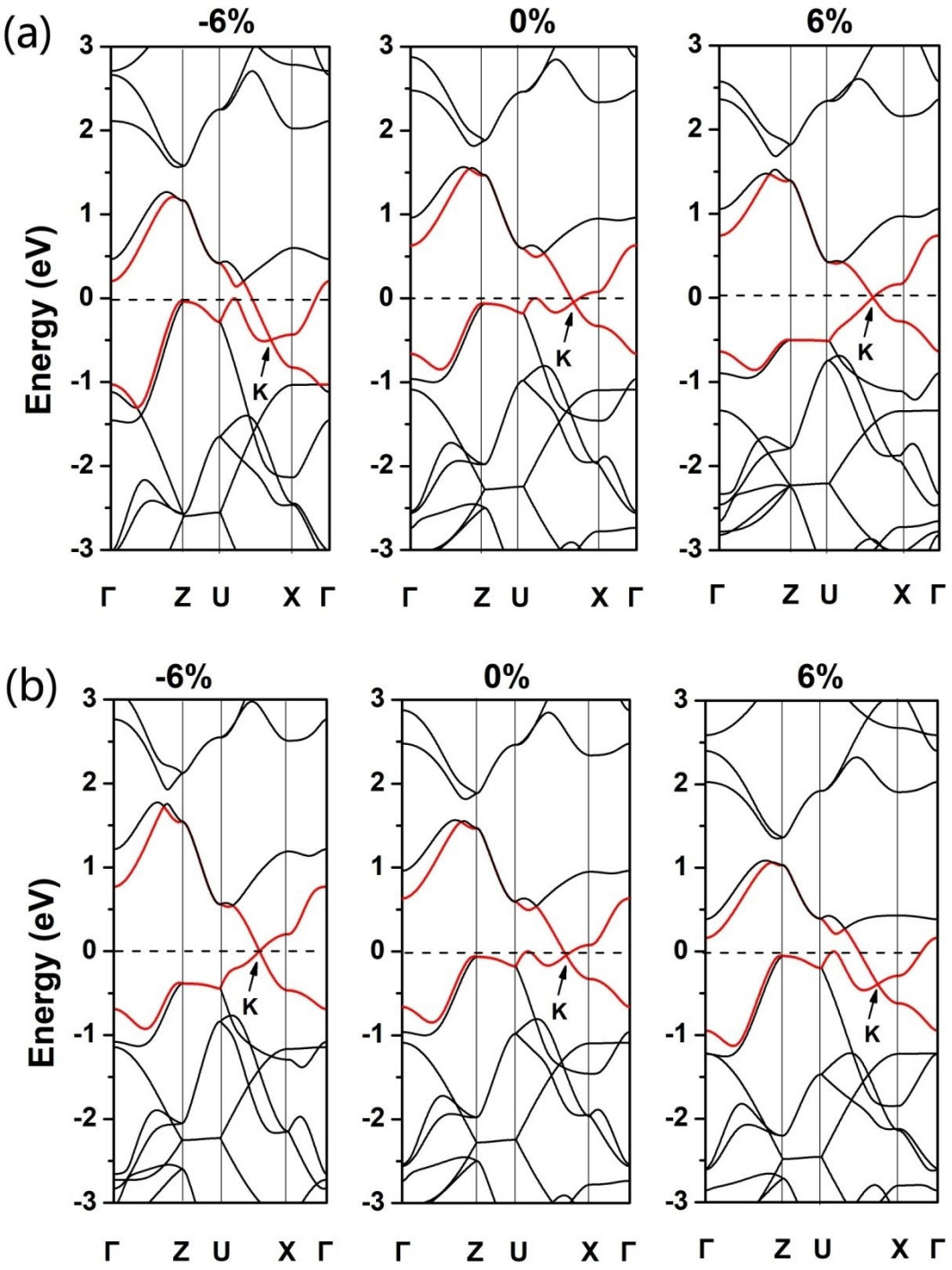

Fig. S4 Variations of electronic band structure against uniaxial selected strain along (a) x and (b) y direction by PBE method.

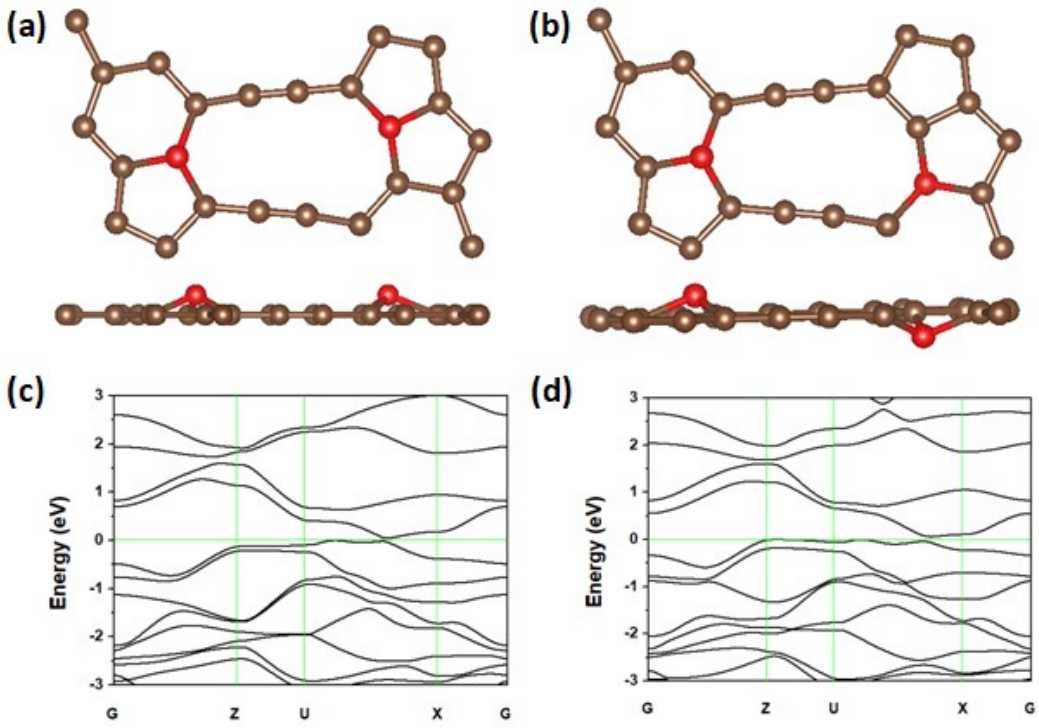

Fig. S5 (a) The structural model with the moved carbon atoms located on one side of the 2D plane and (c) the calculated band structure; (b) the structural model with the moved carbon atoms located on both sides of the plane and (d) the calculated band structure.

Table S1. The structural information (Name), atom numbers (N) and total energies (E*tot*: eV/atom) of different carbon allotropes.

Structures	Energy (eV/atom)	Number of atoms
127-11-84-r568-1	-8.847	84
127-9-68-r4678-1	-8.517	68
127-9-68-r5678-1	-8.889	68
189-12-68-r567-1	-9.034	68
10-13-26-r568-1	-8.985	26
191-7-50-r567-2	-8.991	50
191-8-60-r567-1	-8.733	60
65-5-18-r468-1	-8.895	18

47-12-38-r5678-1	-9.021	38
51-11-44-r568-1	-8.860	44
51-12-44-r567-7	-9.050	44
55-9-36-r4578-1	-8.681	36
graphene	-9.225	2
Penta-graphene	-8.322	6
$Pmc2_1$	-8.855	24
TPO-graphene	-8.580	10