SACADA Database Code: 389

Topology: 4^5T51

# of independent nodes (IN): 5
Transitivity: [5995]
Space Group: C2221
Pearson: oS32
Coordination Number (CN): 4

Year: 2017

Data

Name	Pressure, GPa	Density, g/cm³	Gap, eV	Relative energy, eV/atom	Bulk, GPa	Shear, GPa	Vickers, GPa	Refs
4^5T51 (SACADA #389)		3.365		0.814	391.4	427.4	79.5	SACADA[1]
G78								doi: 10.1002/cphc.201700151

Elasticity tensor (kBar)[1]

9559.4106	1277.0408	1216.1598	0.0000	0.0000	-0.0000
1277.0408	8948.0958	1332.8720	-0.0000	0.0000	0.0000
1216.1598	1332.8720	9073.9566	-0.0000	0.0000	-0.0000
0.0000	-0.0000	-0.0000	3760.7040	0.0000	0.0000
0.0000	0.0000	0.0000	-0.0000	4790.9141	-0.0000
-0.0000	0.0000	-0.0000	0.0000	-0.0000	5052.3496

[1] We apply the density functional theory (DFT) approach by using the Vienna Ab Initio Simulation Package (VASP) to calculate the total energy and properties of carbon allotropes.

DFT calculations

We apply the density functional theory (DFT) approach by using the Vienna Ab Initio Simulation Package (VASP) package [6] to calculate the total energy of carbon allotropes. The Generalized Gradient Approximation [7] (GGA) for exchange-correlational functional is used everywhere. The energy cutoff set to 600 eV. Fully automatic Γ-centered k-points mesh with a reciprocal-space resolution of $2\pi \times 0.025$ Å^{-1} is applied. We used tetrahedron method with Blöchl corrections to perform the k-point integration. The convergence thresholds are set at 10^{-6} eV for energy and 10^{-5} eV Å^{-1} for ionic forces. Polycrystalline elastic moduli — the bulk modulus, the shear modulus, Young's modulus, and the Poisson's ratio ν — have been calculated within the Voigt–Reuss–Hill [8] approximation. The Vicker's hardness H_v has been estimated according to Oganov's model [9].