SACADA Database Code: 632

Topology: 4^3T190-CA

# of independent nodes (IN): 3
Transitivity: [3653]
Space Group: Cmca
Pearson: oS32
Coordination Number (CN): 4

Year: 2023

Data

Name	Pressure, GPa	Density, g/cm³	Gap, eV	Relative energy, eV/atom	Bulk, GPa	Shear, GPa	Vickers, GPa	Refs
4^3T190-CA (SACADA #632)		3.457		0.432	405.0	448.5	83.8	SACADA[1]
4^3T190-CA								doi: 10.1107/S205252062300255X

Elasticity tensor (kBar)[1]

9388.7922	1824.6185	464.7906	0.0000	-0.0000	0.0000
1824.6185	9359.2355	689.0830	-0.0000	0.0000	-0.0000
464.7906	689.0830	11785.5475	-0.0000	0.0000	-0.0000
0.0000	-0.0000	-0.0000	4324.1170	-0.0000	0.0000
-0.0000	0.0000	0.0000	-0.0000	4826.2992	-0.0000
0.0000	-0.0000	-0.0000	-0.0000	-0.0000	4258.1453

[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].