

SACADA Database Code: 601

Topology: 4³T177-CA

of independent nodes (IN): 3

Transitivity: [3(10)(11)6]


Space Group: P-4m2

Pearson: tP24

Coordination Number (CN): 4

Year: 2021

Data

Name	Pressure, GPa	Density, g/cm ³	Gap, eV	Relative energy, eV/atom	Bulk, GPa	Shear, GPa	Vickers, GPa	Refs
4 ³ T177-CA (SACADA #601)		2.988		0.578	336.2	274.3	39.8	SACADA ¹
4 ³ T177-CA								doi: 10.1038/s41524-021-00491-y 

Elasticity tensor (kBar)¹

5850.4099	1694.1525	1853.0785	-0.0000	-0.0000	-0.0000
1694.1525	5850.4099	1853.0785	-0.0000	-0.0000	-0.0000
1853.0785	1853.0785	8115.5517	0.0000	-0.0000	-0.0000
-0.0000	-0.0000	0.0000	2626.6946	-0.0000	-0.0000
-0.0000	0.0000	-0.0000	0.0000	3251.5758	-0.0000
-0.0000	-0.0000	0.0000	-0.0000	-0.0000	3251.5759

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 $2\pi \times 0.025 \text{ \AA}^{-1}$ 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 \AA^{-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].