**SACADA Database Code: 660**

Topology: $4^4$T25-CA

# of independent nodes (IN): 4
Transitivity: [4(11)(11)7]
Space Group: Pccn
Pearson: oP32
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 |
|---|---|---|---|---|---|---|---|---|
| $4^4$T25-CA (SACADA #660) | | 3.497 | | 0.328 | 424.6 | 481.7 | 90.5 | SACADA[1] |
| $4^4$T25-CA | | | | | | | | doi: 10.1107/S205252062300255X |

## Elasticity tensor (kBar)[1]

| | | | | | |
|---|---|---|---|---|---|
| 11870.8525 | 55.7121 | 739.2075 | -0.0000 | 0.0000 | 0.0000 |
| 55.7121 | 12598.8768 | 806.1307 | -0.0000 | 0.0000 | 0.0000 |
| 739.2075 | 806.1307 | 10583.4624 | -0.0000 | 0.0000 | 0.0000 |
| -0.0000 | -0.0000 | -0.0000 | 4406.2770 | 0.0000 | 0.0000 |
| 0.0000 | 0.0000 | 0.0000 | 0.0000 | 4527.7750 | -0.0000 |
| 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0000 | 4215.9465 |

[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].