

SACADA Database Code: 301

Topology: ajk1

of independent nodes (IN): 9
Transitivity: [9(14)(12)9]
Space Group: Pm-3n
Pearson: cP230
Coordination Number (CN): 4

Year: 2011

Data

Name	Pressure, GPa	Density, g/cm ³	Gap, eV	Relative energy, eV/atom	Bulk, GPa	Shear, GPa	Vickers, GPa	Refs
ajk1 (SACADA #301)		3.342		0.784	381.2	448.3	84.8	SACADA ¹
clathrates I-100		3.33			422			doi: 10.1021/jp205676p ☞
clathrates I-100		3.33	6.7					doi: 10.1021/ic102178d ☞

Elasticity tensor (kBar)¹

9625.4628	906.2369	906.2369	-0.0000	0.0000	-0.0000
906.2369	9625.4628	906.2369	-0.0000	0.0000	0.0000
906.2369	906.2369	9625.4628	-0.0000	-0.0000	0.0000
-0.0000	0.0000	0.0000	4567.0690	-0.0000	-0.0000
-0.0000	0.0000	0.0000	-0.0000	4567.0690	0.0000
-0.0000	0.0000	0.0000	-0.0000	0.0000	4567.0690

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 $\text{\AA}^{-1}$ 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].

