

# Właściwości węgla

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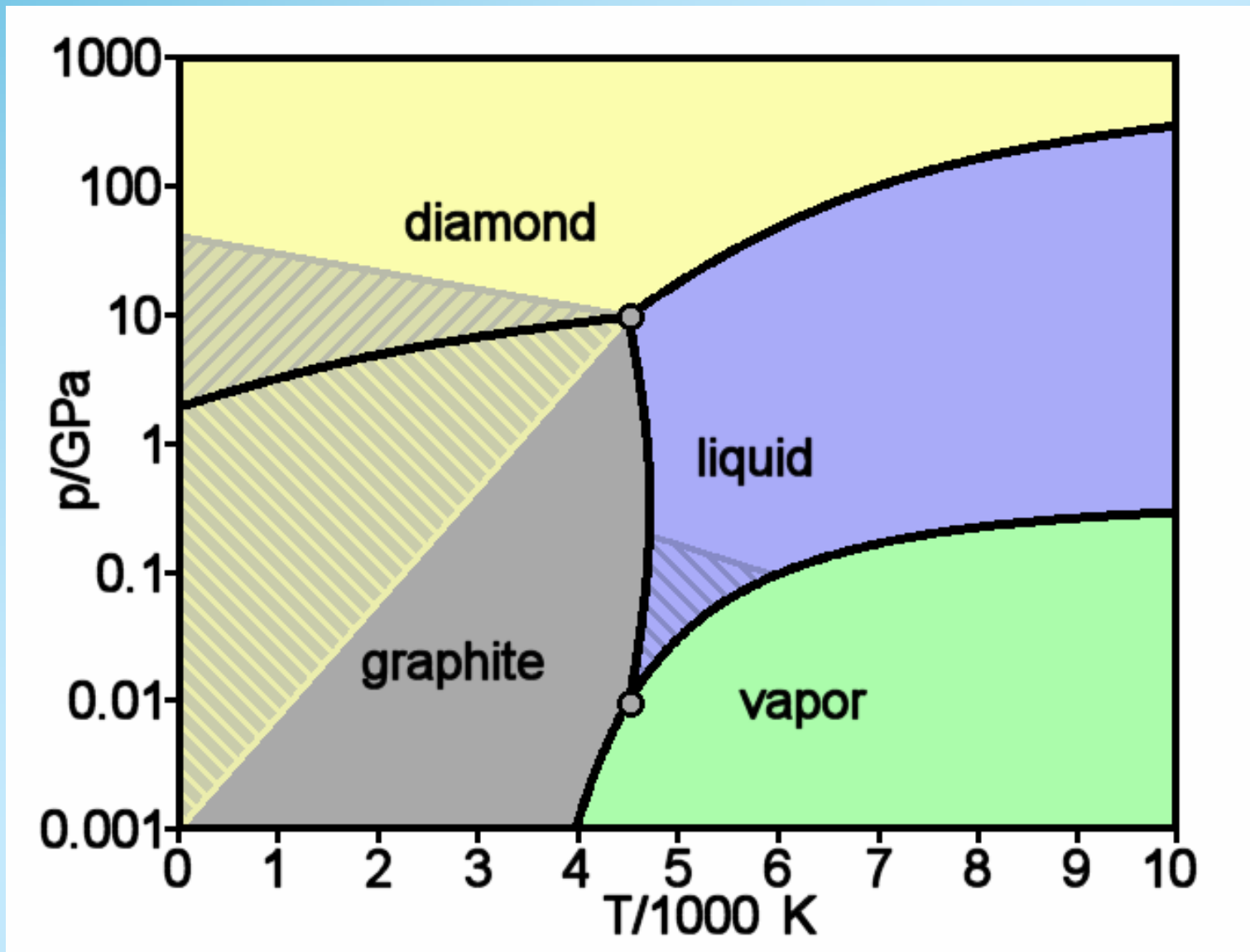
FiTKE

Gdańsk 24.10.2005

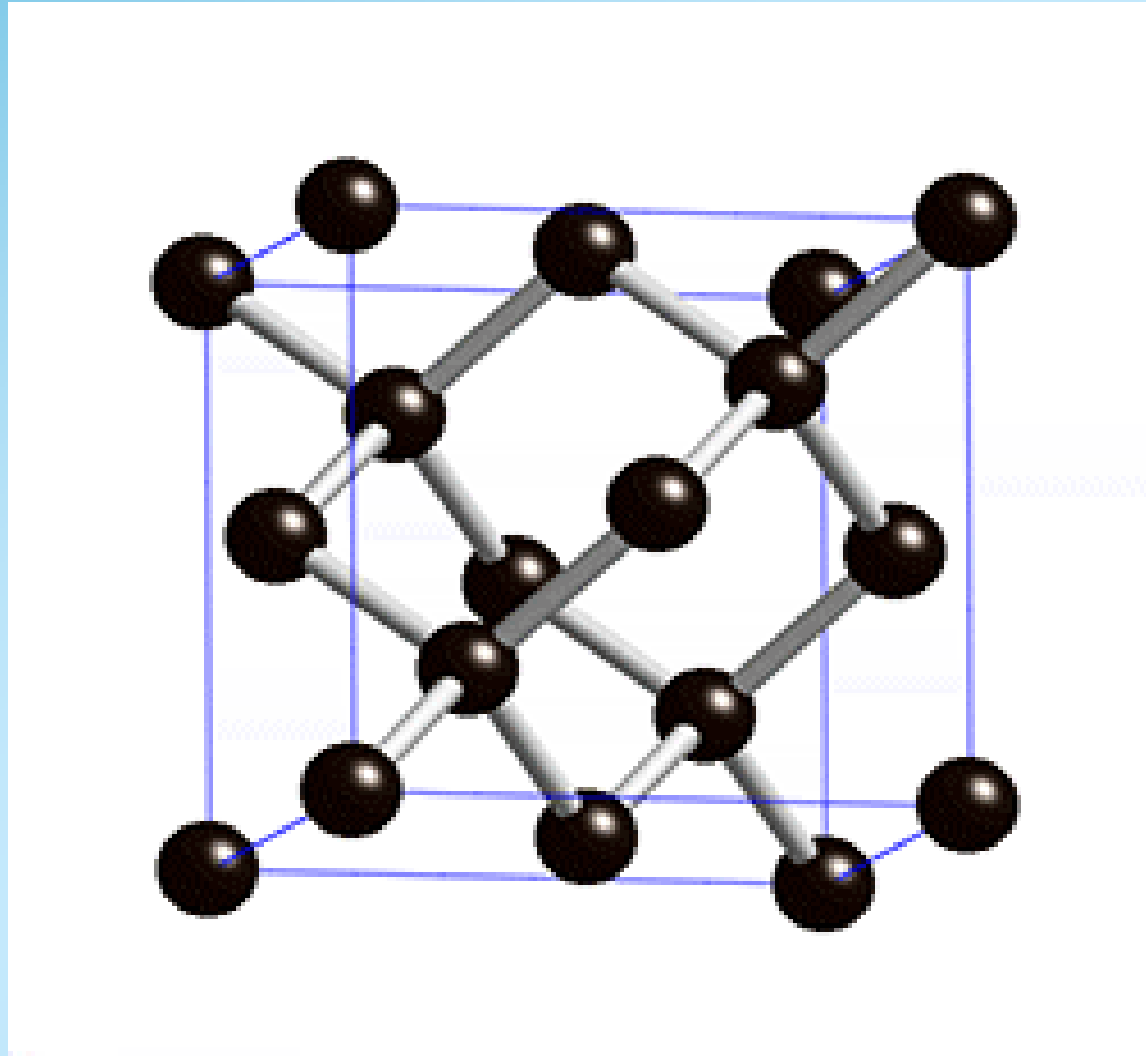
## Odmiany alotropowe węgla

- diament
- Grafit
- Fullereny
- Nanorurki
- Chaoite (ang.)
- Lonsdaleite (ang.)
- Nanopianka
- Aggregated diamond nanorods (ang.)

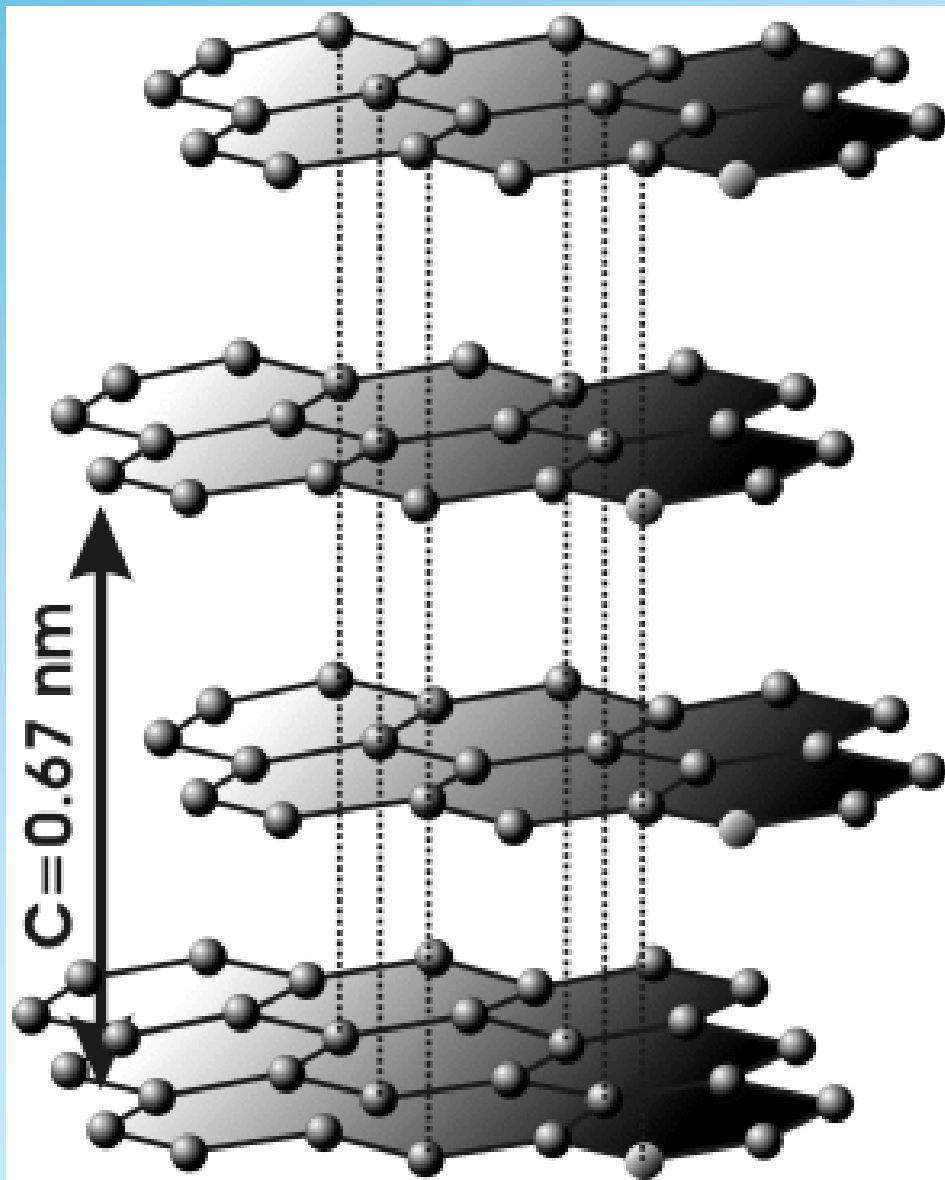
# Odmiiany alotropowe węgla



# Diament



# Diament



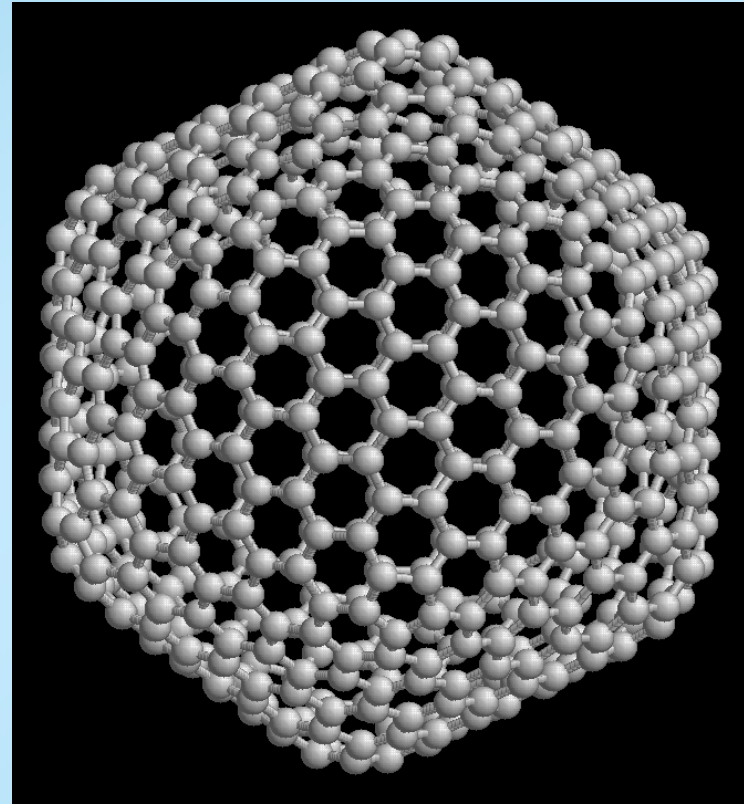
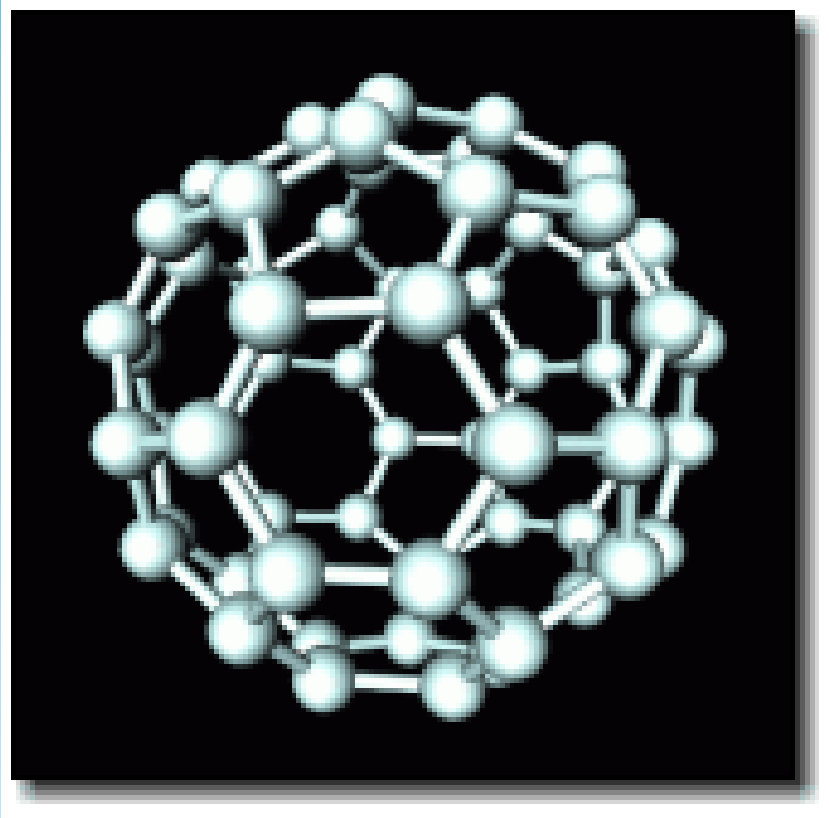
Struktura heksagonalna

# Właściwości węgla

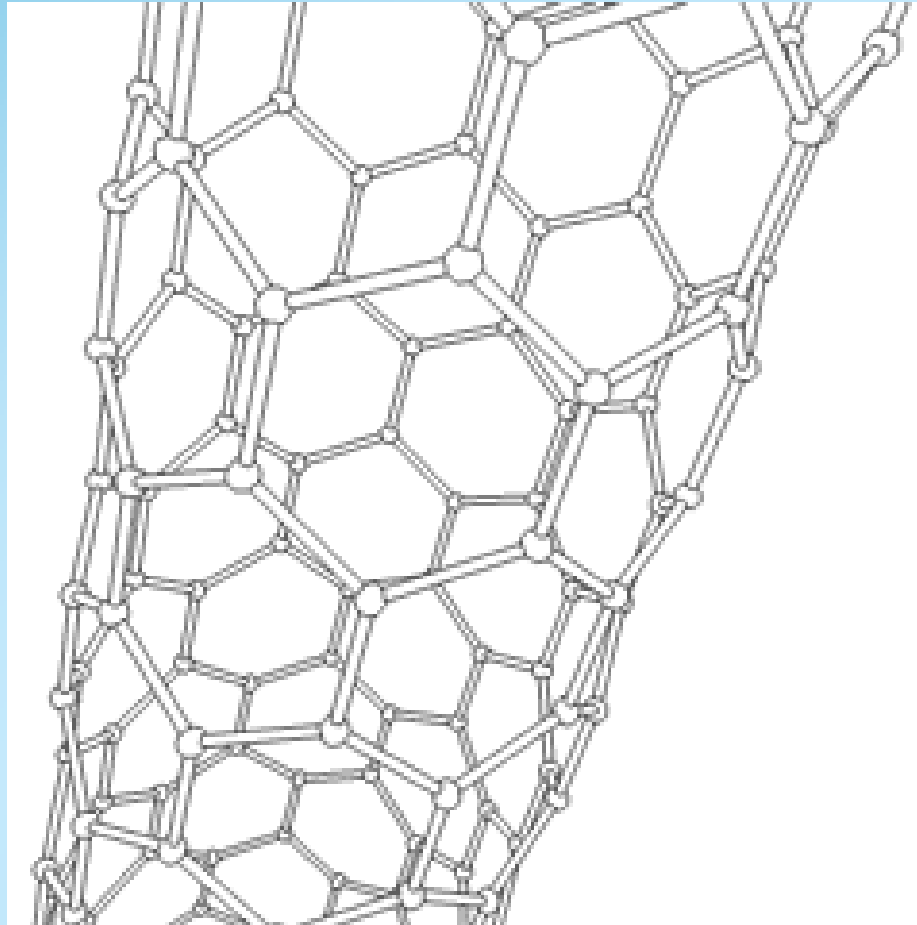
## Grafit vs. diament

Property	Diament	grafit	nanorurki	Units
Hardness	10 000	1992		kg/mm <sup>2</sup>
Strength, tensile	>1.2	0.0195/0.0125	30	GPa
Strength, compressive	442	0.048/-		GPa
Sound velocity	18,000			m/s
Density	3.52	2.267		g/cm <sup>3</sup>
Young's modulus	1.22	11.5/6.8	~1000	GPa
Specific heat	472	715		J/kgK
Thermal expansion coefficient	0.0000011	0.0000043		/K
Thermal conductivity	20.0	180/120	2000	W/cm-K
Debye temperature	2,200	2500		K
Dielectric constant	5.7			Dimensionless
Dielectric strength	10,000,000			V/cm
Electron mobility	2,200	20,000		cm <sup>2</sup> /V-s
Hole mobility	1,600	15,000		cm <sup>2</sup> /V-s
Bandgap	5.45			eV
Resistivity	10 <sup>13</sup> - 10 <sup>16</sup>	8.47/12.05	10 <sup>-4</sup>	Ohm-cm

# Fulereny



## Nanorurki





**Wytrzymałość na ściskanie: 491GPa**