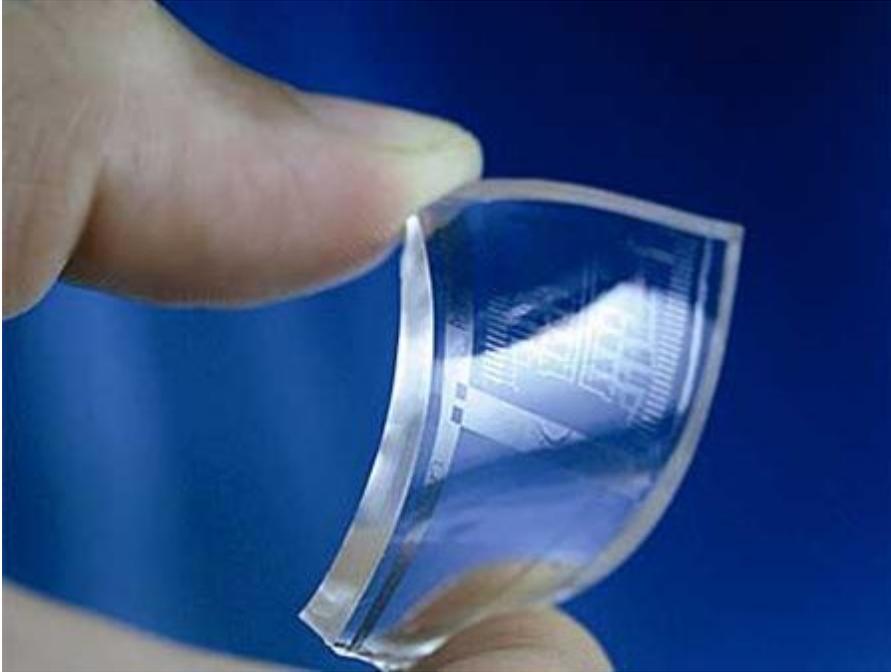


Graphene | Graphene Technology | Graphene The Material Of The Future | Graphene Review | Graphene Properties | Graphene Production

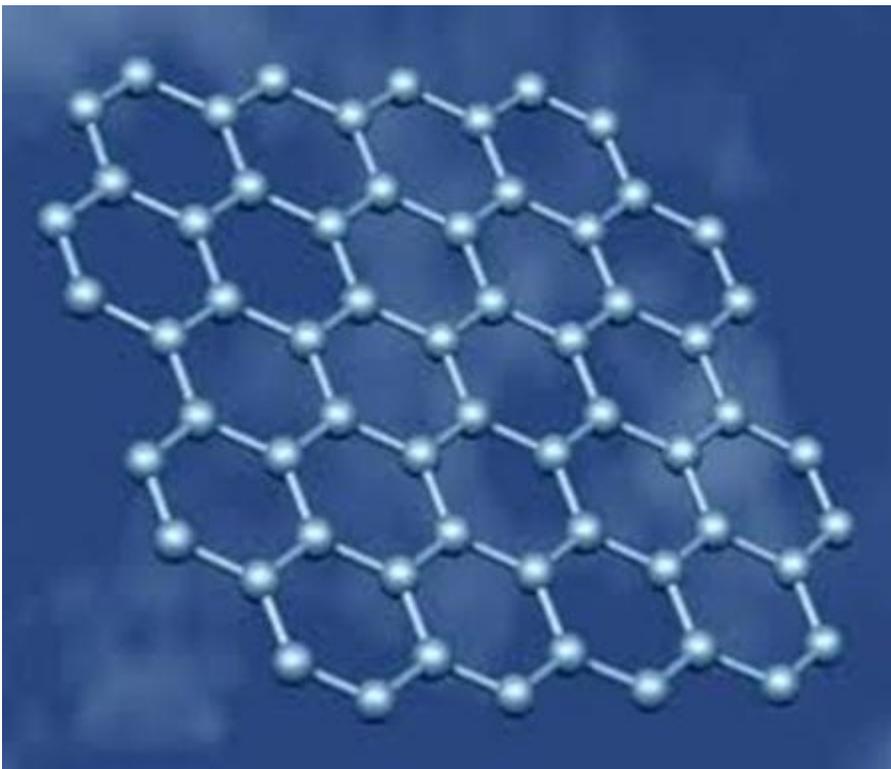


The graphene is a substance which has a single-layer crystal lattice of carbon atoms, which is unusual since it is different from all of the materials of its kind. Several researchers have identified a way of making this substance, which allows them to use it in various fields and especially for the high-speed electronic devices.



Graphene Definition:

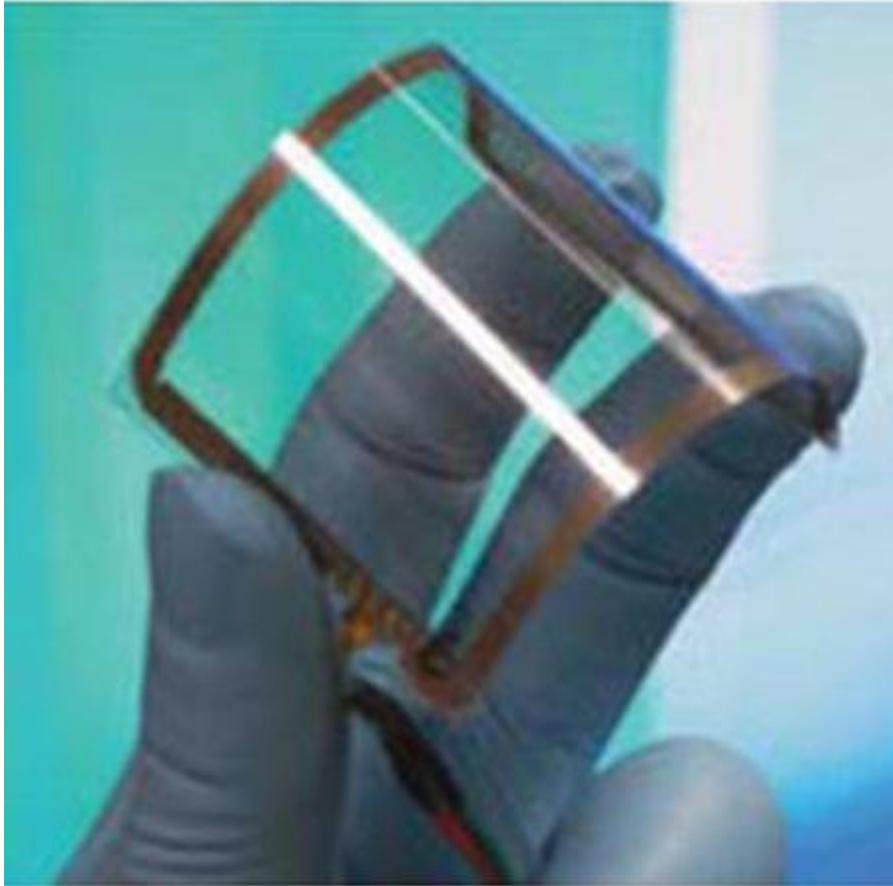
Graphene is defined as a one atom thin sheet of carbon atoms arranged in a Hexagonal format or a flat monolayer of carbon atoms that are tightly packed into a 2D honeycomb lattice.



History:

In October 2010, two University of Manchester (U.K.) scientists, Andre Geim and Konstantin Novoselov, were awarded the 2010 Nobel Prize in physics for their research on graphene. Graphene

is a one-atom-thick sheet of carbon whose strength, flexibility, and electrical conductivity have opened up new horizons for high-energy particle physics research and electronic, optical, and energy applications.

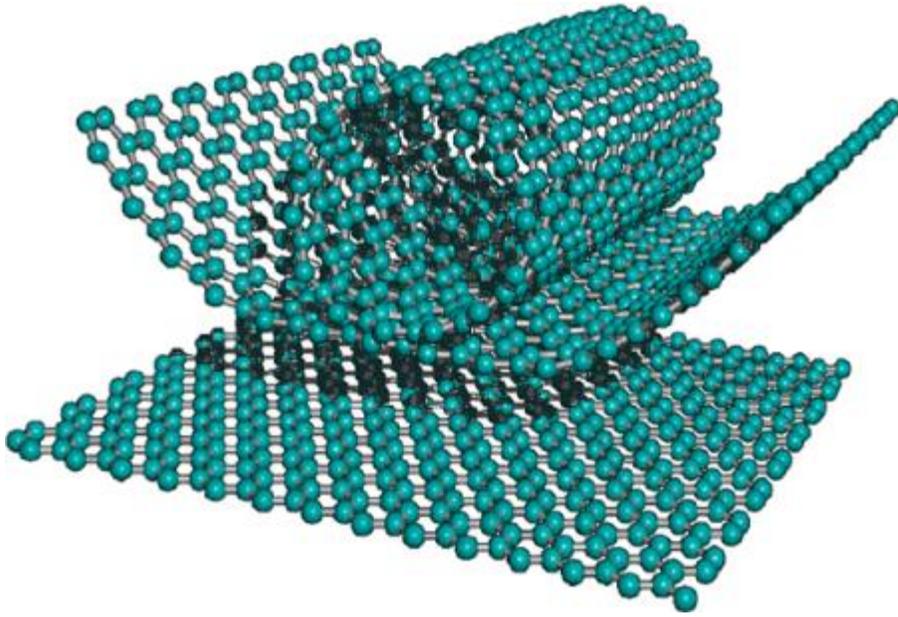


Graphene properties:

Graphene oxide, a single-atomic-layered material made by reacting graphite powders with strong oxidizing agents, has the ability to easily convert into graphene a low-cost carbon-based transparent and flexible electronics.

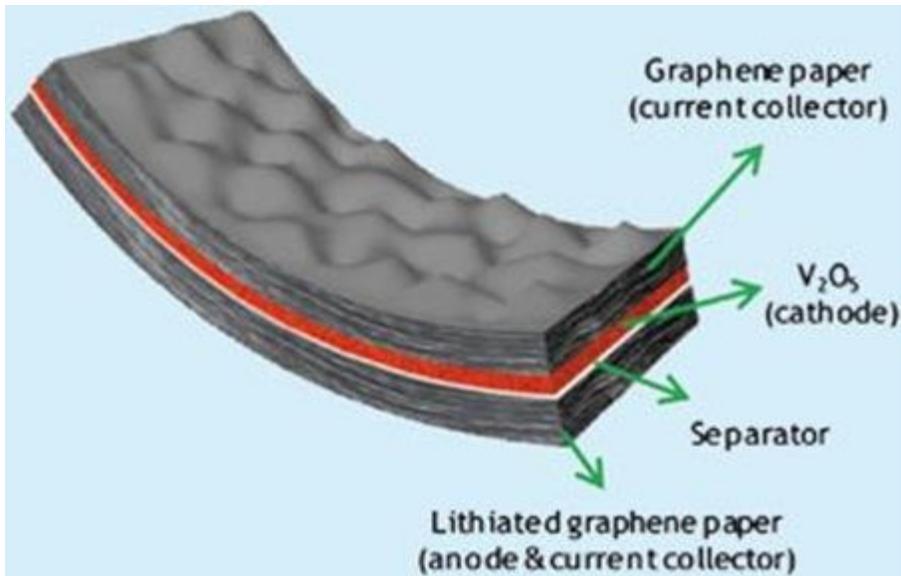
Graphene Oxide:

Graphene oxide has been known in the scientific world for more than a century and was largely described as hydrophilic, or attracted to water. These graphene oxide sheets behave like surfactants, the chemicals in soap and shampoo that make stains disperse in water.



Mechanical Properties:
Young's Modulus:

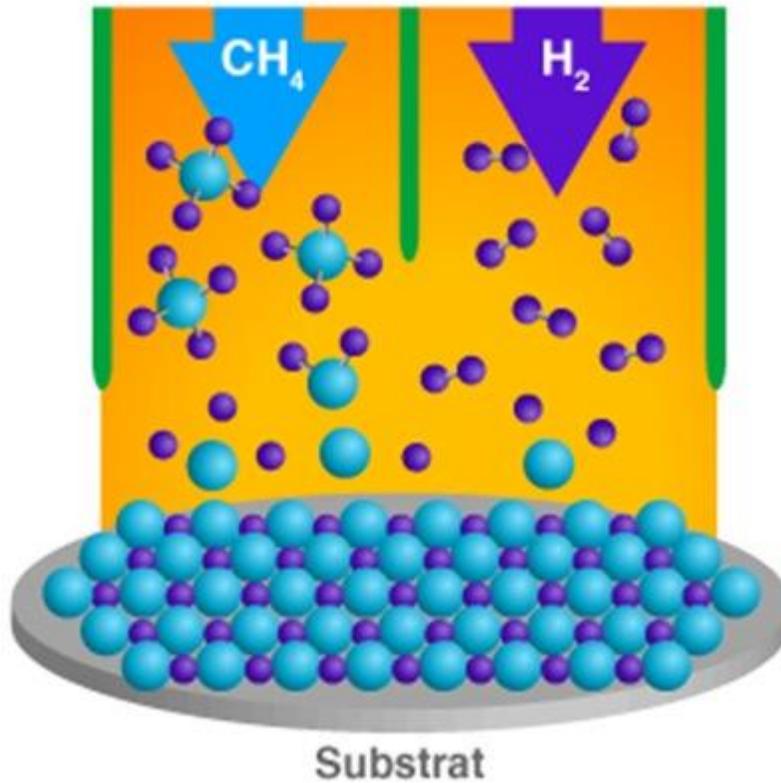
Material	Young's modulus (E) in GPa
Rubber (small strain)	0.01-0.1
PTFE (Teflon)	0.5
Nylon	3-7
Oak wood (along grain)	11
High-strength concrete (under compression)	30
Aluminium alloy	69
Glass (see also diagram below table)	65-90
Titanium (Ti)	105-120
Copper (Cu)	110-130
Silicon (S)	150
Wrought iron and steel	190-210
Tungsten (W)	400-410
Silicon carbide (SiC)	450
Diamond (C)	1,050-1,200
Single walled carbon nanotube	1,000
Graphite/Graphene (within the plane)	1,000



1. Graphene sheets stack to form graphite with an interplanar spacing of 0.335 nm, which means that a stack of 3 million sheets would be only one millimeter thick.
2. Graphene is a Zero Gap Semiconductor. So it has a high electron mobility at room temperature. It's a Superconductor. Electron transfer is 100 times faster than Silicon.
3. Graphene has a record breaking strength of 200 times greater than steel, with a tensile strength of 130GPa.
4. Graphene can be used to create circuits that are almost superconducting, potentially speeding electronic components by as much as 1000 times.
5. Graphene electrodes used in lithium-ion batteries could reduce recharge times from two hours to about 10 minutes.

Graphene Production:

Chemical Vapor Deposition (CVD)



Chemical Vapor Deposition (CVD) and Molecular Beam Epitaxy (MBE) are two other potential routes to Graphene growth.

Applications:



- New devices like Touch screens, Micro Displays and Monitors

- Chip Making, Circuit Designs
- Solar cells
- Micro Fuel Cells
- Air Bag Deployment Systems and Gyroscopes in Car Electronic Stability Control
- Pressure Sensors, Micro Tips & probes

Source:

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