The graphene.

By:

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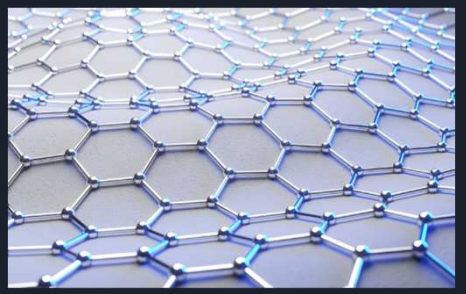
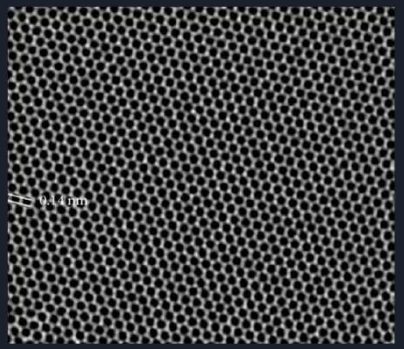
1. Introduction.

- 2D atomic layer of carbon atoms organized in a regular hexagonal pattern.
- Nice properties.
- Material of the future.





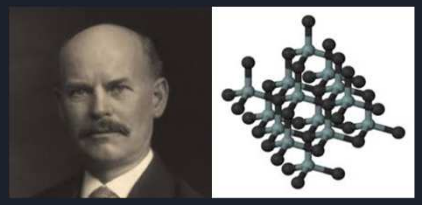
2. History.

Discovery.

1930

2004

2010



Precursor.

Nobel prize.

3. Production.

Mechanical exfoliation.

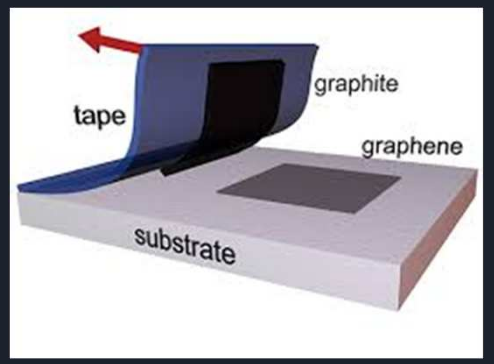
-Easy.

-First method.

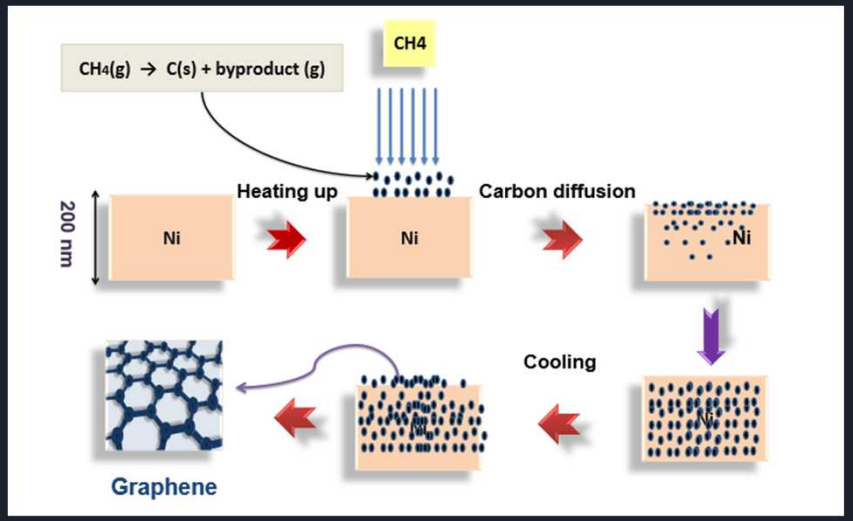
-Small quantities.

-Expensive.

-HQ.



3. Production.



Chemical Vapor Deposition.

-Very common..

-Toxic byproducts.

-Nice quality.

-Cheap.

-High purity

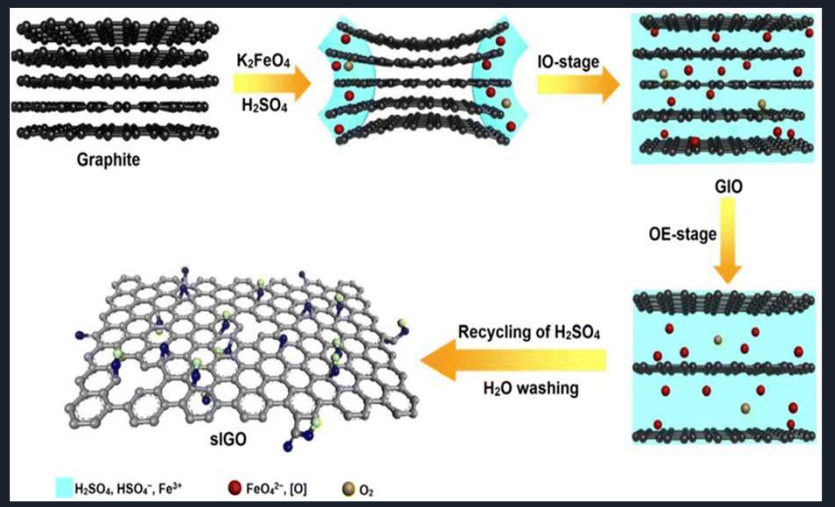
3. Production.

Graphene oxidation (GO).

-Disperses in aqueous solvents.

-Adaptable material for multiple applications.

-Low electrical conductivity..



3. Production.

Reduced graphene oxide (rGO). → ✗ O2

-Thermal reduction.

Structural imperfections.

Worse mechanical strength.

-Chemical reduction.

Toxic materials.

Low efficiency and conductivity.

Scalable method.

-Electrochemical reduction.

Better quality and production.

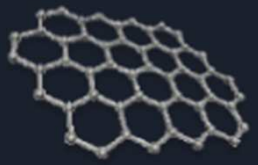
Conductivity like silver.

4. Properties.

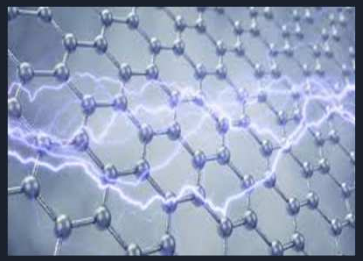
1. Hardness.

2. Light.

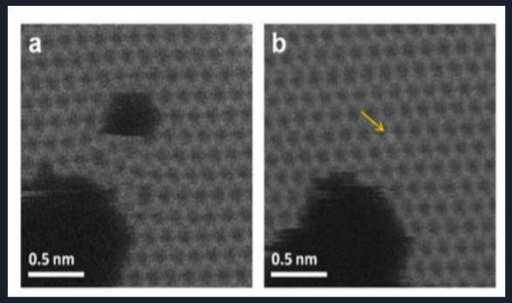
3. Monoatomic layer.



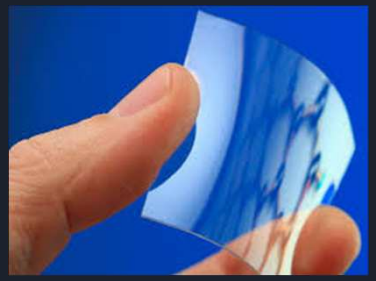
4. High Conductivity.



5. Self-repairing.



6. Transparent.



4. Properties.

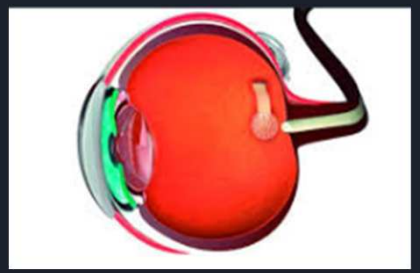
7. Waterproof.

8. Resistant to Ionizing radiation.

9. Generates electricity

10. Bactericide.

11. Biocompatible.



5. Applications and problems.

High speed wires.

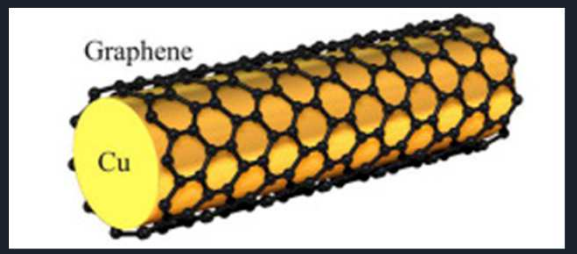
-High capacity to capture light

-Electrons move quickly in it

-Move information hundreds of times faster

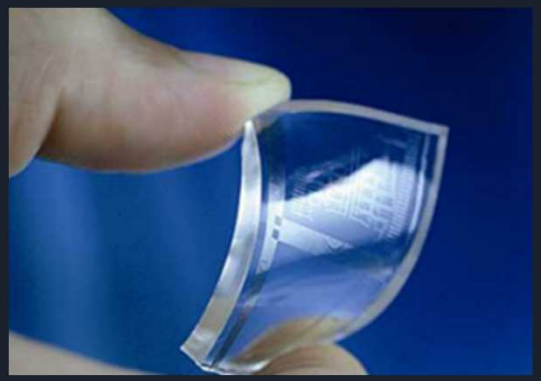
-Faster network installation

capacity to capture light



5. Applications and problems.

Flexible touch screens.



-A sheet of graphene can be completely transparent

-A thin sheet of

-Ideal for placing

5. Applications and problems.

Headphones and speakers.

-Based on a magnetic field

-Sound on a par with current high quality products

-The weight of the product is small

5. Applications and problems.

Cameras.

-A thousand times more sensitive

-Based on a sensor made of graphene

-Consume ten times less energy

-Are five times cheaper

5. Applications and problems.

Medicine.

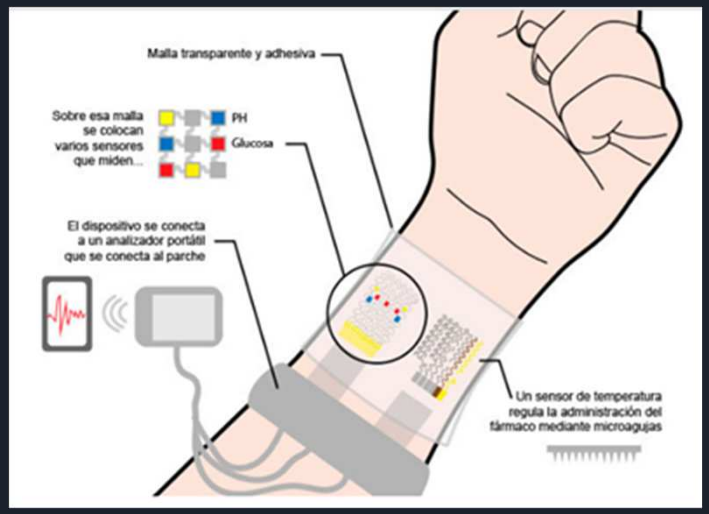
-GO acts as an anticarcinogenic agent

-Used to shrink tumors

-Prevent the spread of cancer

5. Applications and problems.

Sensors.



-A graphene sheet has a planar disposition

-Every atom within the sheet is exposed

-The sensors are very sensitive

5. Applications and problems.

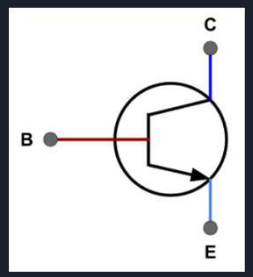
Problems.

-Massive production: ↑ Quality ↓ Scalability

-Health risk: Exposure to graphene nanotubes → Chronic inflammation , mesothelioma

6. Graphene as an electrical conductor.

-Ideal properties for use in transistors (FET)



-Advantages:

- Sensitivity
- Molecular defects
- Conductivity

100 GHz

September 2008

February 2010

September 2010

26 GHz

300 GHz

6. Graphene as an electrical conductor.

-Graphene can be incorporated in various battery systems

↑ Efficiency

Improve the charge cycle rate.

↑ Light and durable

-VO_2 + Graphene → Quick charge

-Graphene batteries + Graphene supercapacitors → Improve the electric car's driving range

7. Conclusion.

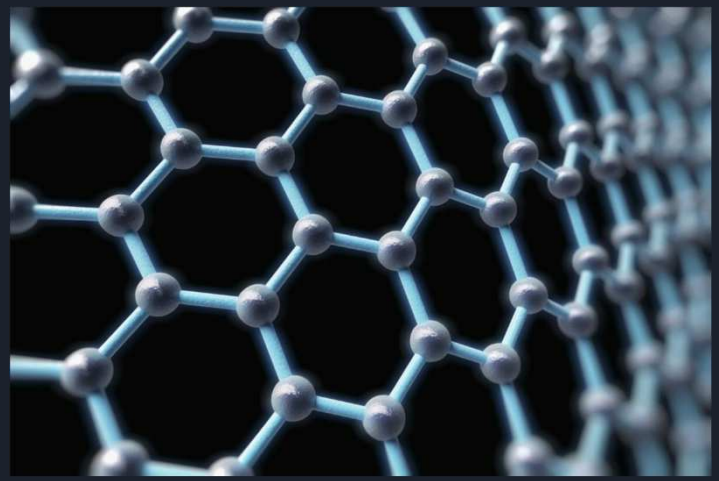
-Its biggest drawback is industrial production.

-Main uses

Research

Specific projects

-Can bring with it new and more fascinating materials



Question time.