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Graphene the Future in Trace of Pencil

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Abstract

This paper consists of that we can produce 17 rapheme in large amount & what are its important applications. We can use 17 rapheme as super capacitors, also it can be use in making mobile phone battery and in making display. We also use 17 rapheme in place of glass window so it will work as solar panel and produce electricity for buildings. It is also used in making aero planes body which is light & strong.

Keyword: Graphene, conductivity, exfoliation, desalination, super capacitors, transparent.

Introduction

Graphene is a single layer of atom that of carbon .It has also known as honeycomb sheet of carbon. It is discovered by two scientists Andre Geim & Konstantin Novoseler in 2004 in university of Manchester.

Why it is known as 2D structure ?

Because it has having only length & breadth. It is single layer of carbon so this is thinnest material in the world.

It has same carbon structure as the graphite we use every day

When we draw or write with our pencil.

But at the same time 0.3 inches of graphite there are 3 million layer of grapheme.

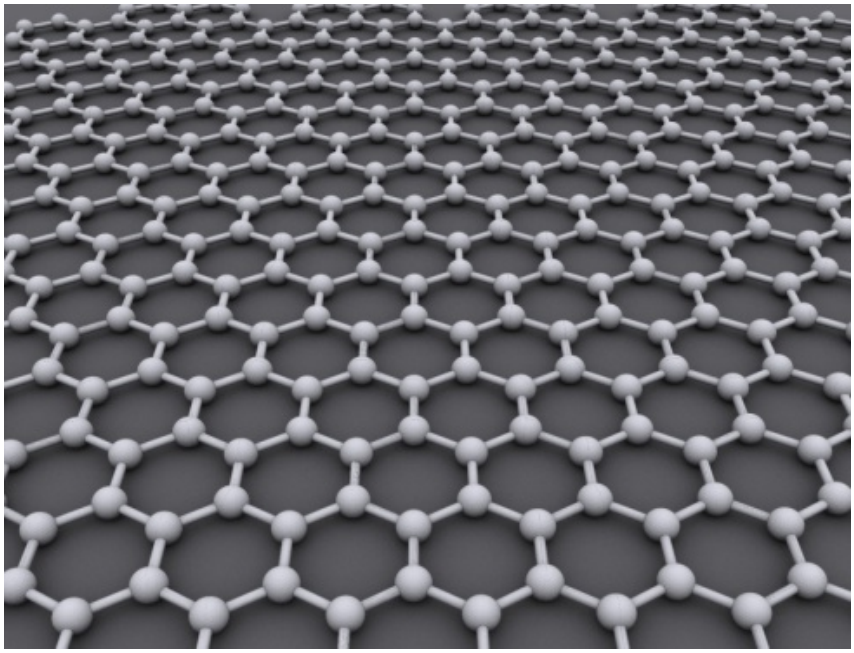

Fig 1: Graphene

Properties

Chemical properties (1)

Oxidation : Graphene can react with active metals (Li,Na,K etc) or oxidized in air .

Reducibility : It can be oxidizing acid ,by which the graphene can be cut into small pieces .

Aromaticity : It is aromatic & has a aromatic properties .It is also has good solubility in non polar solvent's .

Physical properties

- It is the stonger then diamond & 100 times stonger then steel.
- It having best thermal conductivity.
- It having best electrical conductivity.
- It is transparent .
- It is flexible material .
- It is very light in weight .
- One of it's amazing property is it expand when cool & shrink when it get's warm. There is no other example of material with similar quality.

Production

Basic method: Take some sticky tape &well defined graphene & wrapping it apart take 6 rip's &we have graphene & it can do anyone . But we need microscope & idea to find it.

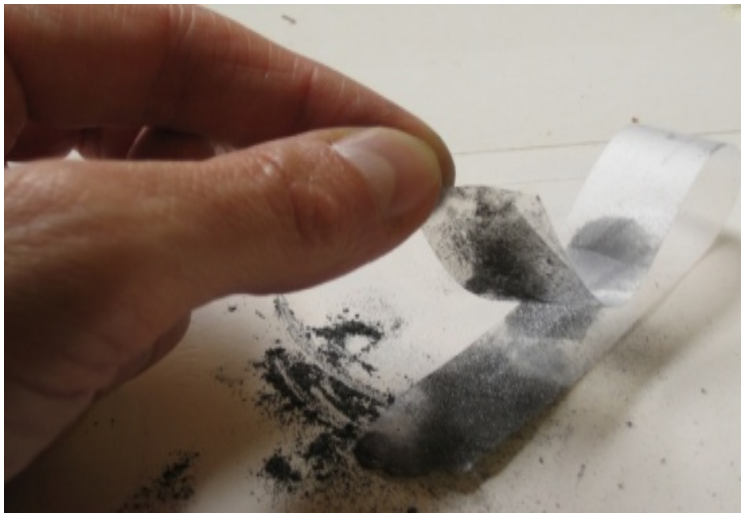

Fig 2: Making Graphene using sticky tape

1. Chemical vapour deposition → (1)

- Carbon atoms are deposited on the surface of metal.
- At high temperature this forms graphene.
- A layer of polymer is deposited on top of the graphene.
- The polymer is removed & gra phene with it.
- The polymer is placed on suitable substrate.
- The polymer is dissolved away & leaving the graphene behind.

2. Mechanical exfoliation
3. Reduction of graphene oxide
4. Liquid phase exfoliation

Applications

1. Display's: Because graphene is too flexible and transparent it can be used in making displays of mobile phones & television. Samsung is making curved display phones so recently it works on making graphene display which are are not easily breakable. (3)

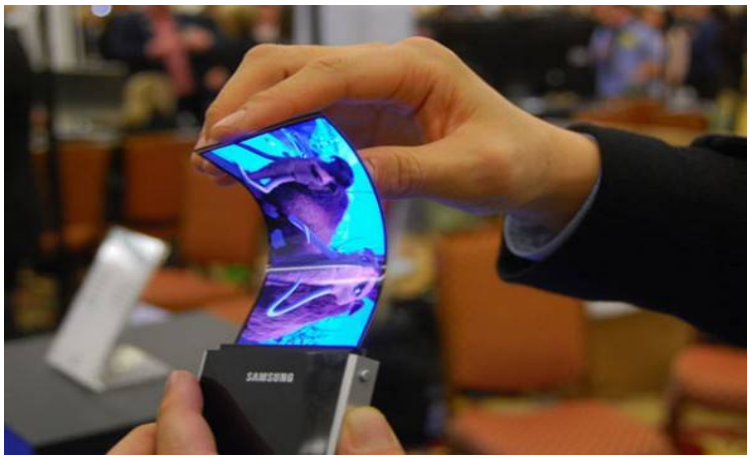

Fig 3 : Samsung Working on Curve Display

2. Super capacitor: A super capacitor is a device which can store energy which can be rapidly charge or discharge. Thus makes is distinctly different from a battery, which takes much longer. Graphene is an ideal material to cooperate in super capacitor to it's remarkable conductivity, it's higher surface area , mechanical reversions & even flexibility . This allows us to create device that can increase efficiency & much cheaper. (2)
3. Battery: Modern lithium ion battery suffer from slow charge time available for short effective life time. Graphene can be cooperate into battery technology to create greatly enhance it's efficiency. Well also advantage it's conductivity ,it's low weight & even it's mechanical flexibility.

Fig 4: Graphene made Battery

4. Desalination of water: Among graphene's host of remarkable traits , its hydrophobia is probably one of the traits most useful for water treatment . Graphene naturally repels water, but when narrow pores are made in it , rapid water permeation is allowed . This sparked ideas regarding the use of graphene for water filtration & desalination . Graphene sheets are able to let water molecules pass but block the passage of contaminants & substances .
5. Health care: Scientist at the university of Illinois have determined that graphene can assist in detecting cancerous cells in the body.

Research from the university of Texas have invented temporary tattoos that are based on graphene .They can keep track of person's vitals , including their levels of hydration & skin temperature .

Advantages

- Graphene made phone battery can charge in 15 mintues .
- It can also used in making body armour (bullet proof jacket) .
- I can also used in making solar panels .
- It can be used in making glowing wallpapers which can replace light bulb in futue .
- It can be used in msaking shoes which are much stretchier & stonger .

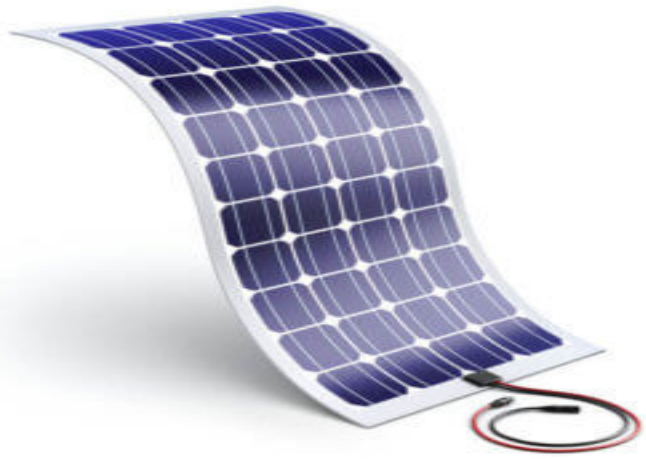

Fig 5: Graphene made Solar Panels

Disadvantage

- Being a great conductor of electricity , although it doesn't have a band gap (can't be swutch off). Scientist are working on rectifying this .
- Research has proven that graphene exhibits some toxic quality.

Conclusion & Observation

From my observations graphene is very important material in future . we all know that automobiles very important but fossil fuels are remain very less . By using this fuels we are also polluting our environment.

So we have to make smart vehicles like electric car. We know that tesla is making electrical car but it maximum range is 400 km in single charge.

So how we can increase the capacity of capacitors? We can make the roof of car by using smart material like graphene . As we know graphene can also use in solar panel's so the roof of car will work as the solar panel & and our graphene made capacitors will charge and by this & we can increase the distance range of vehicles.

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