

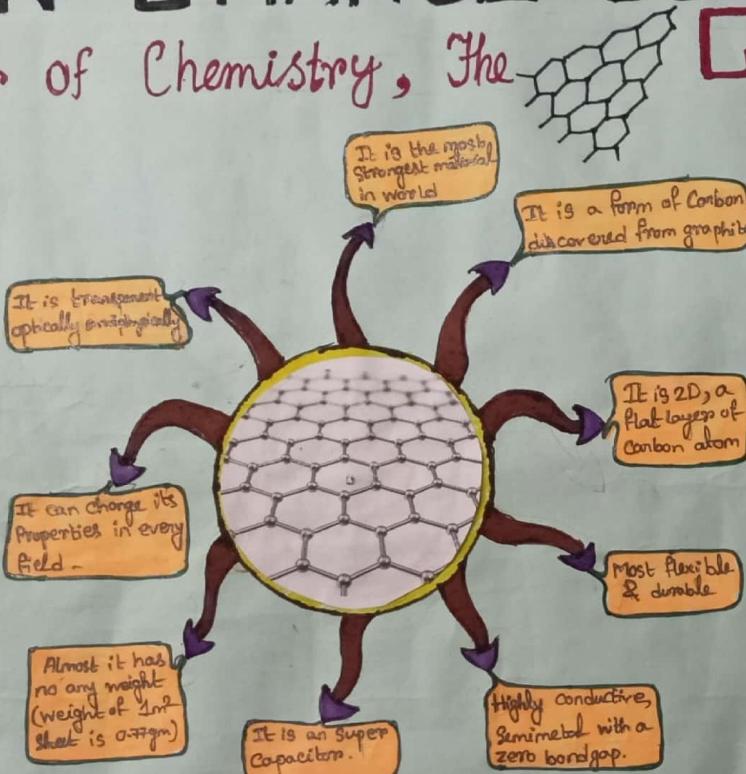
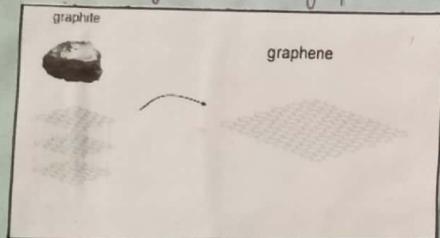
IT CAN CHANGE OUR WORLD

GRAPHENE

The Revolutionary Discover of Chemistry, The

■ What is 'GRAPHENE'?

Graphene is one of the form of Carbon. Like diamonds and graphite, the forms (or 'allotropes') of Carbon have different properties. Graphene is the basic 2D (two dimensional) form of a number of 3D allotropes, such as graphite, charcoal, fullerene and carbon nanotubes. The term graphene was coined as a combination of graphite. Graphene is made of carbon atoms and their bonds. Graphite is many graphene sheets stacked together. Three million graphene sheets stacked to form graphite. So we may say that the 'GRAPHENE' is a single layer of graphite. Since the layers themselves are just one atom high, we need a stack of about three million of these layers to make graphene 1 mm thick.



Prof. Andre Geim and Konstantin Novoselov at the U. Manchester for groundbreaking experiments regarding the 2-D material graphene.

■ History of 'GRAPHENE'.

- Early: Theoretical description
- 1962: Named by Hanns-Peter Boehm (Graphitet-ene)
- 2004: Single atom thick, free-standing graphene is extracted (by Andre Geim and Konstantin Novoselov, Manchester University, U.K.)
- 2005: Anomalous Quantum Hall effect was observed
- 2010: Nobel prize in physics for Andre Geim and Konstantin.
- Now: Stimulate wide researches and be applied to various fields.

■ Why it is our future hero?

- We may have salt free water from Sea by using graphene as the nanopores of graphene rejects salt ions from the seawater.



- It quickly absorb radioactive material from Contaminated Waste water.



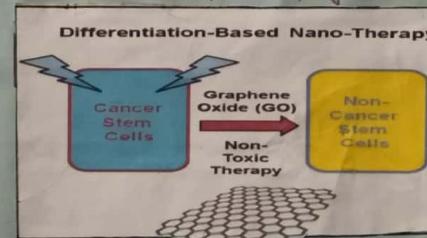
- As it is a super capacitor, it can be used in electrical appliances where induced voltage is needed.



- If it is used in processors, the speed of the processor become ultra-high and minimises the heating problem.



- It is used to make unbreakable and transparent display screen.



- How to make GRAPHENE at home using a Sticky-tape :- Use a lead pencil to deposit a thick layer of graphite onto a paper. Then use ordinary sticky tape to remove a layer from the paper. Use another piece of sticky tape to remove a layer from the paper. Use a third piece of unused sticky tape to remove a layer from the paper. From the second piece of sticky tape, an so on. Eventually, the graphite layer will get thinner and thinner, and we will end up with graphene, which is 'single layer of graphite' in the strict sense, or bi-layer or few layers graphite (which acts almost like graphene in certain uses). Even though this way of making graphene is only a proof of concept, the sticky tape method works. It takes time and patience, but it's the method which the Manchester group used in 2004 and they won a nobel prize for their work.

