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# GRAPHENE

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**ABSTRACT-** The name graphene is derived from graphite and the suffix ene,indicating the presence of double bonds with in carbon structure. Graphene is a two dimensional nanomaterial consisting of a single layer of carbon atoms arranged in a hexagonal honeycomb lattice.It is the thinnest material known but is roughly 200 times stronger than steel and conducts electricity and heat better than copper.When many hundreds of graphene layers build up,they are called graphite.Graphene is known for its high tensile strength,electrical conductivity,transparency and the thinnest two dimentional material in the world.Graphite appears black because it absorbs all visible light wavelengths.Graphene is a single layer of carbon atoms arranged in an hexagonal lattice. Graphene is a unique material due to its superior mechanical preoperties,exceptional thermal and electrical properties,along with high specific area.Graphene is an allotrope of carbon consisting of a single,one atom thick layer of atoms arranged in a hexagonal honeycomb lattice.Graphene is impermeable to gas and liquids,has excellent thermal conductivity and higher current density in comparison to other most effective materials.

**KEYWORD-** Allotrope,Hexagonal,Honeycomb,lattice, etc.

**INDRODUCTION-** The Discovery of graphene provided an immence boost up and new dimension to materials research and nanotechnology.The multidisciplinary characteristic of graphene have wide range of applications from health to aerospace.Graphene is a material that is extracted from graphite and is made up of pure carbon,one of the most important elements in nature and which we find in daily objects like the lead of a pencil.Graphene stands out for being tough,flexible,light and with a high resistance.It is calculated that this material is 200 times more resistant than steel and five times lighter than aluminium.Graphene has applications in the energy,construction,health and electronic sectors.

Among the diverse properties of graphene,the ones that stand out most are its high thermal and electrical conductivity,elasticity,toughness,lightness and resistance.

## PROPERTIES OF GRAPHENE-

**HIGH CONDUCTIVITY-** Through the use of graphene,the useful life of batteries could be increased by 10,as well as charging in less time.In future graphene replaces a large part of the lithium batteries currently in use.

**LIGHTNESS-** Graphene is also suitable for manufacturing batteries for drones,as these would be lighter and tougher.

**TRANSPARENCY AND FLEXIBILITY-** Graphene is transparent material and absorbs very little light.Flexible screens could be manufactured for all types of devices.Graphene can be folded like a film so the chances of breakage are much lower.It is use for manufacturing of cellphones,television,vehicles etc.

**HIGH RESISTANCE-** As well as being an excellent electric conductor,graphene is a very resistant material,so big advances in the lighting sector are expected.

## UESE AND APPLICATIONS OF GRAPHENE-

**IN ENERGY SECTOR-** Graphene transforms the energy sector by revolutionizing power is stored and generated.It enhances the lifespan,charging speed and thermal stability of batteries and supercapacitors. In solar technology,graphene enables the creation of highly transparent,flexible electrodes that boost energy conversion efficiency.Graphene use for manufacturing rechargeable batteries.Graphene prevent devices overheating,so they would be tougher and lighter.

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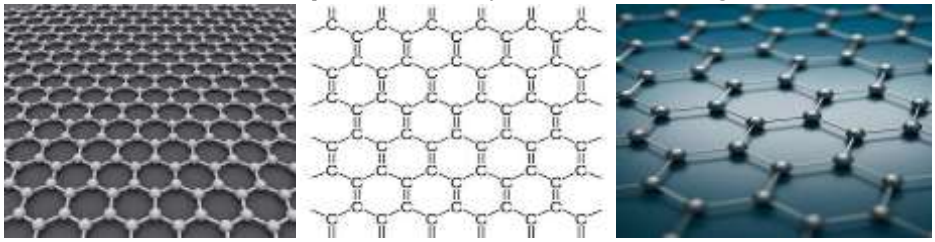

## GRAPHENE(STRUCTURE)

**GRAPHENE IN CONSTRUCTION-** The use of graphene applied to construction to improve the insulation of buildings.Graphene could bemore resistant to corrosion,dampness and fire and therefore tougher and more sustainable. Adding graphene to cement mixtures acts as a "nucleation site" that promotes dense crystal growth,boosting compressive strength by 25% to 40%.This creates an impermeable matrix that prevents water,chloride and sulfate ingress,vastly extending the lifespan of infrastructure.Graphene can be used to improve the performance of a variety of materials,including concrete,steel and asphalt.

**GRAPHENE IN HEALTH-** The applications of graphene in the health and medicine sectors are also increased.It is used for making bones and muscles that would be introduced through surgical operations.Graphene oxide could be a good in the diagnosis of diseases and their subsequent treatment.This is an element that obtained when graphene is oxidized,converting it into a material with extraordinary mechanical properties.

**GRAPHENE IN ELECTRONICS-** The use of graphene can could change the electronic sector completely.With the application of this material smaller,lighter,tougher,and more efficient devices could be manufactured,impossible to obtain with the components that are used today.Graphene has excellent thermal and electrical conductivity,which is 1000 times better than that of copper.

**DRAWBACK OF GRAPHENE-** Graphene's main drawbacks include its high production costs,the lack of a natural band gap for electronics and potential health hazards.Graphene is potential toxicity.Manufacturing perfect,high quality graphene at an industrial scale remains complex,while its sharp nanoparticles can puncture cell membranes and cause toxicity.

**CONCLUSION-** Graphene is a single layer of pure carbon atoms bonded together in a hexagonal lattice,the same pattern as a honeycomb.It is exactly one atom thick,roughly 0.335 nanometers,which makes it the thinnest material.Graphene is a groundbreaking two dimensional carbon allotrope that is one atom thick.Graphene does not have a traditional melting point because like graphite,it undergoes sublimation,when heated,it transitions directly from a solid into a gas.The sublimation temperature of Graphene of 4510 K(4240 Degree Celcius).Graphene is integrated into the electrode of lithium-ion batteries and supercapacitors to vastly increase charge capacity speed up charging time.

## REFERENCES-

**(1).**www.researchgate.net
**(2)** www.motorgy.com
**(3)www.graphiteflake.com**
**(4)** NPTEL
**(5)** Graphene book written by Dr. Neetu Prasad

**BIOGRAPHY-** ER. ARUN KUMAR PRAJAPATI HAS ABOVE NINE YEAR VAST TEACHING EXPERIENCE. HE IS WORKING IN MECHANICAL ENGG. DEPATRTMENT . HE HAS COMPLETED HIS B.TECH. IN ME DEPARTMENT IN 2016.