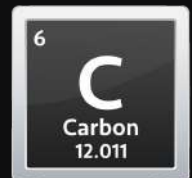




WHAT IS GRAPHITE?



WHAT IS GRAPHITE?

Graphite is a naturally occurring form of carbon with a hexagonal crystal structure. It is a soft, black, metallic-looking mineral that is often used as a lubricant and an electrode material. Graphite can be found in metamorphic rocks such as marble, schist, and gneiss, and can also be found in some igneous rocks.

DID YOU KNOW?

Graphite and diamonds have more in common than many may think! They are both polymorphs, which are minerals that have the same chemical composition (in this case, carbon), but different crystal structures.

In graphite, carbon atoms are linked in hexagonal sheets that resemble chicken-wire fencing. These sheets slide over each other easily, which links to graphite's lubricating properties. In diamond, carbon atoms are linked in an infinite pattern of tetrahedra (four-cornered pyramids), making them very strong.



GRAPHITE

DID YOU KNOW?

Graphite is a refractory material, meaning it is resistant to heat, pressure – or a chemical attack! Graphite was used to hold molten metal before the 1900s, and has since been used in defence. In fact, the UK's Kendal Graphite Mine shows an invoice for the supply of Graphite crucibles for cannonball production to the Napoleonic armoury.

WHAT IS THE HISTORY OF GRAPHITE?

The history of graphite dates back to ancient times, where it was used for writing and drawing. The ancient Egyptians and Greeks used graphite for eye makeup and to lubricate the wheels of chariots. In the 16th century, the deposit of graphite was found in Borrowdale, England, where it was used to make lead pencils.

During the industrial revolution, graphite became an important material for the production of steel and other alloys. The use of graphite as a lubricant also increased during this time. In the late 19th century, the development of the electrical industry increased the demand for graphite. It was used as an electrode material in batteries, and in the production of carbon arc lamps and other electrical devices.

During World War II, the demand for graphite increased as it was used in the production of military equipment, such as radar and aircraft parts. After the war, the use of graphite in the aerospace and nuclear industries increased.

Today, graphite is still widely used in various industrial applications such as lubricants, refractories, batteries, and fuel cells. Additionally, it is becoming increasingly important in the production of advanced materials and technologies, such as graphene, which is a one-atom-thick sheet of graphite with exceptional electronic properties.





GRAPHITE

DID YOU KNOW?

Graphite is used for nuclear applications

Graphite bricks are used at the centre of the entire UK's Advanced Gas-Cooled Reactors (AGRs). The bricks are a crucial safety function, working as neutron moderators which help the nuclear reactor to keep going and stay controlled.

WHY IS GRAPHITE AN IMPORTANT COMMODITY?

Graphite is an important commodity because of its unique properties, which make it useful in a wide range of industrial applications. Some of the most important uses of graphite include:

- **Lubricants:** Graphite is an excellent lubricant because it is stable at high temperatures and high pressures, and it has a low coefficient of friction.
- **Electrodes:** Graphite is a good conductor of electricity and has a high melting point. These properties make it an excellent electrode material in batteries, fuel cells, and other electrical devices.
- **Refractories:** Graphite is used to make high-temperature refractory materials, which are used to line furnace and kiln walls.
- **Pencils:** Graphite is the material used in the "lead" of pencils, which is why it is also known as "black lead."
- **Steelmaking:** Graphite is used in the production of steel as a purifying agent.
- **Advanced materials and technologies:** Graphite is a precursor for the production of graphene, which is a one-atom-thick sheet of graphite with exceptional electronic properties that has the potential to revolutionize many fields such as electronics, energy storage, and materials science.

Graphite is widely used in various industries and applications due to its unique properties, and it is becoming increasingly important in the production of advanced materials and technologies such as batteries, fuel cells, and other energy-related products.

Graphite is also an essential commodity for the growth and development of economies and societies around the world, it is an important mineral for the manufacturing of many everyday products and it is used in many industries. As the demand for new





GRAPHITE

DID YOU KNOW?

Graphite is a mineral that forms when carbon is subjected to heat and pressure in Earth's crust and in the upper mantle. Pressures in the range of 75,000 pounds per square inch and temperatures in the range of 750 degrees Celsius are needed to produce graphite.

HOW IS GRAPHITE MINED?

How is Graphite mined?

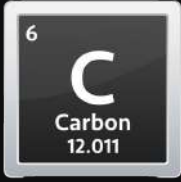
Graphite is typically mined using both underground and open-pit mining methods. The method used depends on the deposit and the quality of the graphite.

1. **Underground mining:** This method is used when the graphite deposit is deep in the ground. Miners excavate tunnels and shafts to access the graphite, which is then extracted and transported to the surface for processing.
2. **Open-pit mining:** This method is used when the graphite deposit is close to the surface. The surface of the ground is removed to access the graphite, which is then extracted and transported to a processing facility.

Once the graphite is extracted from the ground, it is typically crushed and processed to remove impurities. The graphite is then processed to create various products such as graphite powder, graphite flakes, and graphite blocks. The mining process can have negative impacts on the environment.

To minimize this, companies are encouraged to conduct mining in an environmentally responsible manner. This may include, for example, reclaiming mined land, preserving natural habitats, and limiting the use of water and other resources. Additionally, companies are increasingly investing in new technologies and practices to reduce the environmental impact of mining and processing graphite.





GRAPHITE

DID YOU KNOW?

On its own, graphite is an all-star, but it also makes a handy supporting player. Graphite is used in carbon-reinforced plastics, out of which many common products are made. Fishing rods, golf clubs, bicycle frames, sports car body panels, pool cues, and even the fuselage of the Boeing 787 air crafts are just a few places where you can find graphite at work.

WHAT EVERYDAY PRODUCTS CONTAIN GRAPHITE?

Graphite is a versatile material that is used in a wide range of everyday products. Some examples of products that contain graphite include:

- **Lubricants:** Graphite is used as a lubricant in many high-temperature and high-pressure applications such as machinery, engines, and gears.
- **Batteries:** Graphite is used as an electrode material in batteries, such as lithium-ion batteries found in smartphones, laptops, and electric vehicles.
- **Fuel cells:** Graphite is used as an electrode material in fuel cells, which generate electricity through a chemical reaction.
- **Pencils:** Graphite is the material used in the "lead" of pencils, which is why it is also known as "black lead."
- **Lubricants:** Graphite is used as a lubricant in many high-temperature and high-pressure applications such as machinery, engines, and gears.
- **Fireproofing:** Graphite is used as a fireproofing material for buildings, appliances, and other structures.
- **Carbon brushes:** Graphite is used in the production of carbon brushes which are used in electric motors, generators, and other electrical equipment.
- **Sports equipment:** Graphite is used to make golf clubs, tennis rackets, and other sports equipment.

