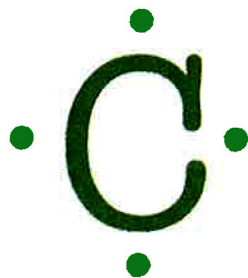


Discovery of Carbon

Carbon was discovered thousands of years ago. The Chinese knew certain black rocks would burn, which were later discovered to be coal. Coal is made out of carbon, hydrogen, oxygen, nitrogen, and varying amounts of sulfur. Coal burns in a combustion reaction with oxygen producing water, carbon dioxide and heat.

Diamonds were discovered as early as 2500 BCE. The first recorded finding of diamonds was 3000 years ago in India, where they were valued for their ability to reflect light. In those days, diamonds were used for decorative purposes, warding off evil spirits, and providing protection during battle.

In 1772, a scientist by the name of Antoine Lavoisier showed that diamonds were also a form of carbon by burning them. Another scientist, Carl Wilhelm Scheele, showed that graphite, which people thought was a form of lead, was actually a type of carbon as well. When he burned equivalent weights of diamonds and graphite they both produced the same amount of carbon dioxide. In 1789, Antoine Lavoisier listed carbon in his textbook.



Chemical Properties

Carbon is the sixth most abundant element on earth. It has four valence electrons and exists in nature in three different forms: amorphous, graphite and diamond. Amorphous carbon is an ash that has been burned. Graphite is one of the softest materials on earth and diamond is one of the hardest materials on earth. Graphite and diamond are both pure carbon; what makes their appearance so different from each other is how their atoms are bonded.

Graphite is black and chalky because the atoms are bonded together in the form of sheets. The sheets of graphite are held together with Van der Waals forces, which allows them to slide past each other. Graphite is composed of carbon atoms with sp^2 hybridized orbitals which means that each carbon is bonded to three other carbons in a planar (or flat) arrangement creating the sheets. The carbon atoms of diamond are different. In diamonds, covalent bonds hold carbon atoms together by sharing electrons in three dimensions. Carbon atoms in diamond have an sp^3 hybridized orbitals, meaning that there are four atoms bonded to each carbon in a tetrahedral arrangement. The atoms are tightly bonded in every direction, making diamond the strongest mineral. Diamond is formed by carbon atoms being compressed deep beneath the Earth's crust.

Historical Conflict: Industrial Revolution

Carbon played a large role in the Industrial Revolution and the pollution produced during that time. By the late 19th century, machine powered factories

became a significant part of society. It was a time when life evolved from an agricultural standard to a modern machine-based standard. With more machines being built, the factories needed more workers. People began leaving farms and moving into towns seeking employment at the factories. Children were sent to work in the mines to dig for coal that was used to fuel the machines, causing large amounts of pollution in the cities. However, the people most affected by the pollution were the factory workers. Many of the workers lived in slums close to the factories, where they experienced overcrowding, disease, and filthy, polluted conditions. The upper class was not affected as much by the pollution because they lived in the nicer parts of town, away from the factories.

The industrial production of coal was fundamental to the conflict between growth and pollution. Coal is largely made of carbon, a major pollutant, which was expelled into the air in vast quantities during the Industrial Revolution. Burning wood originally produced fuel for machinery, but by the 19th Century, coal replaced wood because it was easier to find and produced more energy. Burning

Chemistry and Conflict

large amounts of coal produced black smog that mixed with mist, causing pollution that covered the skies around the factories and fell in thick layers on the surfaces of the towns. Even wildlife was affected by pollution, such as the peppered moth. Before the factories started, peppered moths were able to blend in with the trees to hide from predators, leaving the black moths to be eaten. However, when the pollution started, surfaces became covered in soot and the light colored moths were unable to hide from predators. The pollution added to the terrible living conditions of the workers. The towns were overcrowded, dirty, and many people suffered from disease because of the lack of plumbing and sewage systems.

There was no alternative to pollution during the Industrial Revolution. The progression of the Industrial Revolution was moving too fast to have any control over the pollution it caused. Coal was the most cost effective resource and factory owners did not care about the affect it was having on the world, as long as they were making a profit. No one knew the production of coal powered machines would have such an extensive effect on the world's future generations.

Contemporary Conflict: Blood Diamonds

The term blood diamonds refers to the illicit trade of diamonds to provide funds for the civil wars in Liberia, Sierra Leone, Angola, the Democratic Republic of Congo, and the Ivory Coast. From 1989-2001, Liberia traded diamonds in exchange for weapons to use in wars. The conditions in the mining operations were terrible. Soldiers that watched over the mines would torture, beat, rape and kill the children and adults that worked there. Some mines were closed off from the military. That made them much safer to work in, but those were the exceptions. The majority of the mines still have extreme working conditions. Before 2000, 4% of the world's diamonds were blood diamonds; but when the Kimberley Process Certification Scheme was created, the number was reduced to less than 1%. The Kimberley Process Certification Scheme is an international process that ensures the diamonds traded do not fund violence. With Africa trading their diamonds illegally to other countries, 20% of people that buy diamonds have no idea that they are contributing to the problem of illicitly traded goods and helping fund civil wars.



Chemistry and Conflict

Blood diamonds are linked to the Industrial Revolution through carbon. During the Industrial Revolution, carbon, in the form of coal, was a significant source of energy and pollution from the 19th century to today. It contributed to health hazards for many of the factory workers and their families, especially lung disease and cancer. In both the Industrial Revolution and blood diamonds, adults and children mined the product, endured horrible working conditions, and were often abused by the industrialists or military officers that supervised the mines.

Solution

A possible solution to stop the blood diamond issue is to promote the Kimberly Process Certification Scheme. Currently the Kimberly Process Certification Scheme has 45 members representing 75 countries. Expanding the number of countries involved would prevent consumer companies from purchasing blood diamonds from current civil war territories. This way the diamonds cannot be sold to fund weapons or cause more wars, and the amount of weapons obtained would be limited. The profit that

funds the civil wars would eventually dry up, creating a chance for peaceful government. Diamond companies should purchase their diamonds from safer sources. There are many other sources of diamonds in the world. Of all diamonds, 1% are mined in conflict areas. The other 99% are conflict-free. There are more conflict free diamond mines in Africa, Australia, Borneo, and Canada that can export to consumer companies. With more rules and a heightened public awareness there is still hope that the mining of blood diamonds will come to a complete stop.