

Phosphate rock



A phosphate mine in North Carolina. (Source: [The U.S. Fish & Wildlife Service](#))

Phosphate rock is used for its phosphorus content. Hennig Brand discovered the element phosphorus in the year 1669. He isolated it in a set of experiments on urine, each experiment requiring at least 50 to 60 buckets! Phosphorus is a very important component of the DNA and RNA molecules of which all life is formed. It is also important for the development of animal teeth and bones. The name *phosphorus* comes from the Greek word *phosphoros*, which means *bringer of light*. Phosphorus is mined in the form of phosphate rock.

Phosphate rock is formed in oceans in the form of calcium phosphate, called *phosphorite*. It is deposited in extensive layers that cover thousands of square miles. Originally, the element phosphorus is dissolved from rocks. Some of this phosphorus goes into the soil where plants absorb it; some is carried by streams to the oceans. In the oceans the phosphorus is precipitated by organisms and sometimes by chemical reaction. Phosphorus-rich sediments alternate with other sediments (geologists say these beds are *interstratified*). Phosphorus-rich beds usually have very few fossils; however, deposits in Florida and North Carolina contain a large amount of marine fossils. Some geologists believe that the formation of these phosphorus layers occur under a very special condition in which no other type of sediment is present. In addition, it is believed that phosphorus-rich rock is deposited in a body of water in which there is no oxygen; this is called an *anaerobic* environment. Many theories say that phosphorus is absorbed by ocean plants that die. As they decompose, the phosphorus accumulates. Despite many theories, studies about the formation of phosphate rock continue and theories about its deposition are developing.

In addition to the sedimentary phosphate deposits, there are some igneous rocks that are also rich in phosphate minerals. Sedimentary phosphate deposits, however, are more plentiful.

Sources of Occurrence

Large deposits of phosphate from igneous rock are found in Canada, Russia, and South Africa. Deep-sea exploration of the world's oceans has revealed that there are large deposits of phosphates on the continental shelf and on seamounts in the Atlantic and Pacific Oceans. Recovering these deposits, however, is still too expensive, so they remain untouched for now. In the United States, phosphate rock is mined in Florida, North Carolina, Utah and Idaho. Florida and North Carolina account for approximately 85% of phosphate rock production in the United States. U.S. companies export large quantities of phosphate fertilizers all over the world. Phosphate rock is imported to the United States as well. Nearly all of these imports come from Morocco, a major supplier of phosphate rock to the world; however much of the Moroccan deposits are controlled by long term lease or ownership by China.

Most of the phosphate rock in Florida as well as some other locales contains significant concentrations of radioactive Uranium. This becomes an issue when the processed phosphate rock is used for a wide variety of crops. Certain types of crops take up Uranium readily, and thus a health risk is posed to humans who consume such products. An example species that absorbs Uranium readily is tobacco, the use of which is already strongly implicated in human lung cancer from smokers.

Uses

Some phosphate rock is processed to recover elemental phosphorus. Pure phosphorus is used to make chemicals for use in industry.

The most important use of phosphate rock, though, is in the production of phosphate fertilizers for agriculture. Some is used to make calcium phosphate nutritional supplements for animals.

Substitutes and Alternative Sources

Phosphorus is so important to life, that there is no substitute for it in agriculture. As for alternative sources, the phosphorus deposits on the ocean floor may one day be recovered when a profitable method of deep ocean mining is developed.

Further Reading

- Common Minerals and Their Uses, Mineral Information Institute.
- More than 170 Mineral Photographs, Mineral Information Institute.

Source: <http://www.eoearth.org/view/article/155217/>