



value of phosphorus

Phosphorus is one of the seven “bio-essentials,” or elements required for all known forms of life. In the human body, besides combining with calcium to make up our bones and teeth, phosphorus serves two vital functions. First, phosphorus is critical to the structure of DNA, the complex molecule that makes up our genetic code. DNA is like a ladder that has been twisted into a spiral, and the element that holds one rung of that ladder to the next is phosphorus. Second, phosphorus is essential to basic body function. When our bodies burn sugar, the energy is made available to our cells in a molecule that either adds a phosphorus atom (to store energy) or gives up that phosphorus (to release energy) in a process known as “ADP to ATP conversion.” It would be hard to imagine two functions more important to our lives than the storing of genetic information and the ability to convert food into energy.

Our modern society uses phosphorus in thousands of ways, some essential, others for our convenience and enjoyment. Bayer’s P4 business, which does phosphate mining and phosphorus manufacturing, uses phosphorus to develop crop protection products for farmers. Phosphorus is also the key component of the brightener in toothpaste, it provides the tangy fizz to most soda pop, and, when added to baking soda, it becomes the common bread and cake ingredient of baking powder.

When phosphorus binds with compounds like calcium or sulfur, it becomes very resistant to combustion, and so it is frequently used in modern fire retardants. The US Forest Service uses a form of phosphorus to put out forest fires, and the aviation industry places an additive made from phosphorus in hydraulic fluids on airplanes to reduce the risk of in-air fires.

Phosphorus has long been used to sanitize equipment and remove germs from liquids and foods. A number of “food grade” phosphorus compounds are used to keep food fresh and germ-free. A common product derived from phosphorus is used to keep city water systems from developing giardia or other microbial diseases. And most hospitals use phosphorus-based products to sanitize laundry, food preparation, and surgical surfaces.

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A Vital Resource |||||



Last but not least, of course, phosphorus is one of the “big three” elements (along with nitrogen and potassium) in common fertilizers. This is because these elements are frequently depleted from soils farmed year after year. It is ironic that, while essential for plant growth, phosphorus compounds have also been awarded the National Medal of Technology for making highly effective and environmentally preferred tools to control unwanted weeds.

Elemental phosphorus does not exist in nature. In order to produce it for these various applications, it must be recovered from phosphate ore through a process that uses highly purified carbon to strip oxygen away from the phosphate, leaving the pure elemental phosphorus. There are only a few places on Earth with all the right conditions, equipment, and materials to make phosphorus. In the Americas, the only such place is Soda Springs, Idaho. Other world sources of phosphorus include Kazakhstan, China, and Vietnam.

The proposed Caldwell Canyon mine will be the world’s most environmentally-advanced and sustainable source of phosphorus, capable of keeping the current Soda Springs elemental phosphorus plant running at full capacity for 35 to 40 years.

