

Diatomite

Alan Founie, the diatomite commodity specialist for the U.S. Geological Survey, has compiled the following information on diatomite, used in everything from containing industrial spills to producing beer and wine.

Diatomite is a soft, very fine-grained, siliceous sedimentary rock that is usually very light grey or beige in color. It is very finely porous, very low in density and essentially chemically inert. Rocks containing diatomite are excellent reservoir rocks for hydrocarbons.

Diatomite is one of the few natural nonfuel mineral resources of biologic origin. It consists almost exclusively of the miniscule skeletons of aquatic algae known as diatoms. Diatoms are a type of algae that blooms in lakes, streams and oceans. Diatoms are abundant today, and they were common in many ancient environments.

The diatom cells contain an internal, elaborate siliceous skeleton consisting of two valves (frustules) that vary from less than 1 micrometer to more than 1 millimeter in diameter but are typically 10 to 200 micrometers across and have a broad variety of delicate, lacy, perforated shapes varying from spheres and cylinders to discs, ladders, feathers, and needles. Accumulations over thousands of years of these skeletons in some lakes and shallow marine environments are extremely thick and produced what is known as diatomite.

Recovery of diatomite from most deposits is through low-cost, open pit methods. Explosives are not normally needed at either surface or underground operations because of the soft, friable nature of the rock. Diatomite usually is processed near the mine to reduce the cost of hauling the crude ore, which can contain as much as 65 percent water.

The United States is the world's leading producer and consumer of diatomite and accounts for about one-third of annual world production. In 2005, 653,000 tons of diatomite valued at \$179 million was produced in California, Nevada, Oregon and Washington. Other nations with significant diatomite production are China and Denmark.

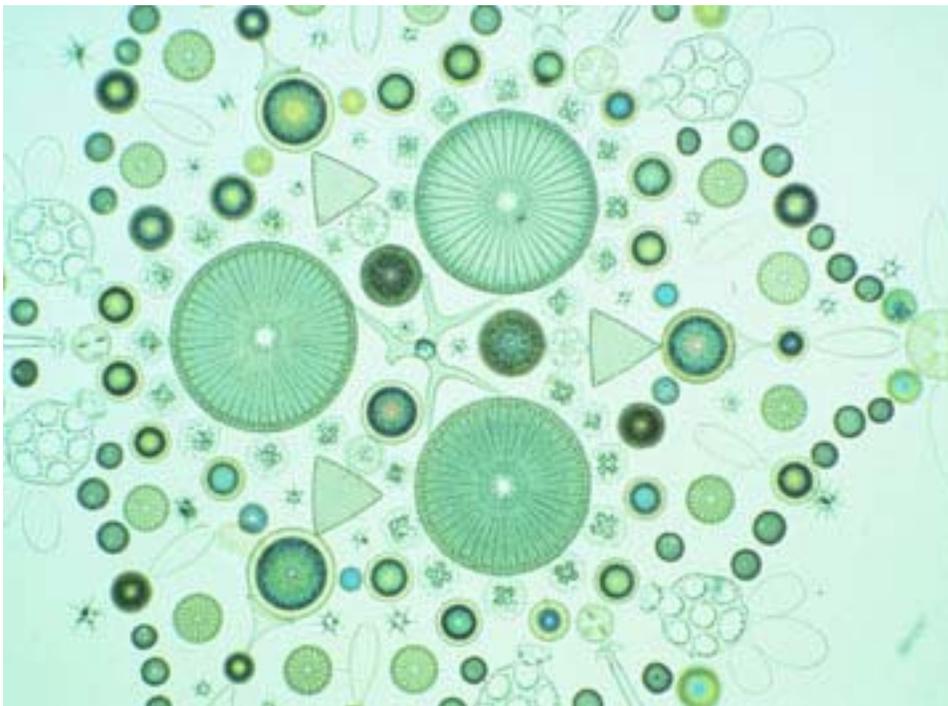
Diatomite was used by the ancient Greeks as an abrasive and as a source of lightweight building bricks and blocks. In the mid-1800s, diatomite became of industrial interest in Western Europe when pulverized diatomite became the preferred absorbent and stabilizer of nitroglycerine used in Alfred Nobel's invention, dynamite.

The first U.S. production of diatomite was in Maryland in 1884. In the late 1880s, huge, very pure, deposits identified near Lompoc, Calif., became the focus of mining interest. These deposits remain prominent in world markets today, and resource estimates indicate that at current use rates the deposits near Lompoc could supply the entire world diatomite demand for several hundred years.

The major use of diatomite is as a filtration medium for beverages (especially beer and wine), sugar and sweetener liquors, oils and fats, petroleum and chemical processing, pharmaceuticals, and water (industrial processes, potable, swimming pool and waste). The use of diatomite for biological filtration, including filtering human blood plasma has grown in recent years.

Diatomite sawn into shapes continues to account for a significant part of world diatomite production and it has long been used as lightweight building material, especially in China. Other uses of diatomite include insulation and insecticide. Although many substitutes are available for diatomite for some of its uses, its unique qualities ensure its continued use in many applications. For example, tradition and taste factors in the wine and beer industries, which are by far the largest users of diatomite as a filter, will limit encroachment into that market for the foreseeable future.

Originally published as *Geotimes* Mineral Resource of the Month, September 2006
Used with permission.



Freshwater diatoms as seen through a high-powered microscope. Image from *Minerals in Your World*.