

DANGEROUS MINERALS

A recent *Rock & Gem Magazine* article highlighted and explained in detail about how to safely handle the collecting, storing, displaying, and studying of ten of the top most hazardous minerals. Information on the mineral article was authored by Steve Voynick who explained that he obtained most of his info from a website as follows; (www.listsverse.com/2013/03/07/10-most-deadly-rocks-and-minerals/)

According to Listverse, the ten most deadly minerals are:

- **CINNABAR:** Mercury Sulfide, “*the single most toxic mineral to handle on Earth*”! Most abundant of the few mercury-bearing minerals, and the only ore of mercury. Occurs in veins and replacement deposits in volcanic areas and hot springs. It is bright red in color with a hardness of 2-2.5; native mercury is a silvery, toxic, liquid metal that when absorbed or inhaled from vapors, can corrode the membranes of the brain, nervous system, liver, and kidneys. It also impairs the body’s immune, genetic, and enzyme systems. Short term contact can cause bleeding gums, vomiting, and stomach pain.
- **ORPIMENT:** Arsenic Sulfide, that is about 75% arsenic, with a hardness of 1.5 to 2.0. Also, another closely related mineral is **REALGAR**, which has the same attributes. Both occur together in low-temperature hydrothermal environments, and as condensates in fumarole environments. **REALGAR** is bright red; **ORPIMENT** is yellowish-orange. The semi-metal, arsenic, has a long history of poisoning and death. Traces of arsenic occur naturally in the human body, and in many foods, and water sources. Ingesting as little as 0.1 gram can be fatal. Because arsenic and phosphorous are chemically similar, arsenic can easily replace phosphorous in the ATP molecule[adenosine triphosphate], a chemical necessary to both plants and animals to provide metabolic energy.
- **STIBNITE:** Antimony Trisulfide, occurs mainly in low-temperature, hydrothermal veins. It crystallizes in the orthorhombic system, often in radiating clusters or sprays of long, striated, silvery-gray prisms with a gleaming, and sometimes slightly iridescent, metallic luster. It owes its toxicity to antimony, a semimetal closely related to arsenic. Stibnite, which is 72% antimony, is a particular toxic form of antimony, as well as a known carcinogen.
- **TORBERNITE:** Hydrated Copper Uranium Phosphate, crystallizes in the tetragonal mineral system, as thick to thin tabular crystals, and as foliated and micaceous aggregates. Because of its transparent to translucent emerald green crystals, it is popular among collectors. It is made of more than 50% radioactive uranium. Radioactivity, the emission of energetic, ionizing, electromagnetic energy as waves or particles, is the product of atomic decay, the natural disintegration of unstable atoms or isotopes. Ionizing radiation usually consists of a mix of alpha and beta particles, and gamma rays. Ionizing radiation can destabilize atoms it strikes by knocking electrons from their orbits, thus altering the atom. Handling of torbernite can allow gamma rays to penetrate tissue of the hands and fingers. Torbernite also emits a colorless, tasteless, odorless, and invisible radon gas in the form of highly radioactive isotopes called “radon daughters”. High levels of radon gas are very carcinogenic when inhaled.
- **ARSENOPYRITE:** Iron Arsenic Sulfide, crystallizes in the monoclinic system as short, or equant prisms with a gray-white color, and a bright, metallic luster. It has a hardness of 5.5-6.0, and arsenic accounts for 50% of its weight. Although, not as crumbly as orpiment or realgar, it is nevertheless unstable. Striking it with a hammer or metal object, releases the garlicky odor of arsenic; heating it will also release arsenic vapors.
- **CHRYSOTILE:** Basic Magnesium Silicate is a mineral of asbestos. The industrial term “asbestos” refers to the fibrous form of a group of complex, monoclinic silicates.

Chrysotile is the most widely mined asbestos-group mineral. Nonflammable asbestos fibers are manufactured into fireproof fabrics, insulation, and construction materials, as well as asphalt, caulking compounds, paints, and brake linings. When tiny asbestos fibers are inhaled, they penetrate delicate tissues of the lungs, and eventually trigger abnormal cell growth. This condition, known as asbestosis, can cause lung cancer and mesothelioma, as long as 30 years after exposure. The main hazard comes from the mining and milling of asbestos minerals, and from manufacturing and working with asbestos products.

- **GALENA:** Lead Sulfide is the most abundant lead-bearing mineral on earth, and the primary ore of lead. It crystallizes in the cubic system as well developed cubes, with a dark, lead-gray color, and a dull to bright, metallic luster. When lead in any form is ingested or inhaled, red blood cells absorb the metal, concentrating it at first in the liver and kidneys, and eventually in the bones. Lead adversely affects the central nervous system, and the blood-brain barrier that protects the brain from harmful chemicals. Although galena is relatively stable, its surface will, over time, alter to a fine, powdery, white film of lead oxide, or lead carbonate. Always wash your hands when handling galena. This precaution applies to other collectible lead minerals, such as: Cerussite [lead carbonate], Wulfenite [lead molybdate], Crocoite [lead chromate], Vanadinite [lead chlorovanadate], and Pyromorphite [lead chlorophosphate].
- **HUTCHINSONITE:** Lead Thallium Arsenic Sulfide is a rare mineral that forms long, prismatic to acicular [needlelike] crystals in attractive, complex aggregates and radiating clusters. It is transparent to opaque with a dark cherry-red color, and an adamantine [diamond-like] luster. It contains three potentially hazardous elements, and Listverse describes it as a “lethal mineral cocktail”. In addition to arsenic and lead Hutchinsonite contains thallium, a toxic heavy metal. Thallium’s toxicity is due to its strong affinity to sulfur. It readily replaces sulfur in protein molecules, thereby disrupting normal cellular function. Thallium and its compounds, which are also carcinogens, are easily absorbed through the skin.
- **CHALCANTHITE:** Hydrated Copper Sulfate is collected for its short, prismatic to tabular, bright-blue crystals. It is a secondary mineral that forms in the oxidation [upper, near surface] zones of copper deposits, usually in moist conditions. Chalcantite’s toxicity is due to its copper content, which accounts for 40% by weight. While most copper minerals are relatively safe to handle, chalcantite is an exception because of its extreme solubility. In trace amounts, copper is an essential nutrient, and the body closely regulates its levels. But because of its extreme solubility, chalcantite frees large amounts of copper ions [cations, or positive ions], that can overwhelm the body’s regulation mechanism, resulting in copper poisoning, and subsequent metabolic failure.
- **COLORADOITE:** Mercury Telluride usually occurs in granular or massive form. As a rare mineral with a grayish-black color, and a dull, metallic luster, coloradoite is not often collected. Both mercury and tellurium are toxic. Tellurium is a rare, semimetallic element with limited uses as a semiconductor, as a gasoline antiknock additive, and a blue coloring agent for glass products. Coloradoite is unstable and releases vapors of both mercury and tellurium when heated. The vapors are quickly absorbed when inhaled, and cause impair the normal functioning of the intestinal tract and central nervous system.

SAFETY RULES FOR MINERAL HANDLING

- NEVER POWDER OR GRIND UP A MINERAL SPECIMEN.
- NEVER TREAT SPECIMENS WITH CHEMICALS.
- NEVER HEAT SPECIMENS.
- MINIMIZE OR ENTIRELY AVOID SKIN CONTACT WITH SPECIMENS.
- NEVER TASTE TEST ANY MINERAL SPECIMEN.
- NEVER STORE OR HANDLE SPECIMENS IN LIVING, OR EATING AREAS OF THE HOME.
- STORE RADIOACTIVE SPECIMENS AWAY FROM LIVING AREAS, AND IN VENTILATED OUT-BLDGS.
- NEVER HANDLE FIBROUS ASBESTOS MINERALS IN ANY WAY THAT WOULD RELEASE FIBERS.
- KEEP ALL SPECIMENS AWAY FROM CHILDREN AND PETS.
- CLEAN ALL SURFACES THAT SPECIMENS HAVE CONTACTED.
- ALWAYS WASH HANDS AFTER HANDLING MINERAL SPECIMENS.

