



Color pieces on the pie chart indicate presence of the commodity at locations indicated on the map. They do not represent commodity quantities or relative concentrations.

DISCUSSION

A broad and simple definition of industrial minerals is that they are principally non-metallic (that is, they are not utilized exclusively as metals even though the material in question is, strictly speaking, a metallic mineral), non-fuel rocks and minerals. They include a broad range of minerals that are consumed for a wide variety of industrial uses. Industrial minerals are generally regarded as common, simple products that are sold cheaply into local markets; however, many are actually quite rare, most are extremely complex, some far exceed the price of the more glamorous metals, and a significant proportion are shipped to markets around the world. This map shows the locations of documented occurrences of metallic industrial minerals in Alaska, as determined by a review of published literature. For the purpose of this map series, metallic industrial minerals are defined as those industrial minerals that can occur as a metal in pure form, or can be used as metals in addition to their utility as non-metals. The accompanying information booklet contains bibliographic data for the sources used to generate this map.

Industrial Minerals: Metallic

- **Aluminum:** Aluminum is highly valued for its strength and light weight. Aluminum conducts electricity and can be used in alloys, chemicals, explosives, and paints. Bauxite is the principle ore of aluminum.
- **Chromium:** The three principal uses for chromium are metallurgical, refractory, and chemical. It can be used to harden steel, as a component in paint and chemicals, and for automobile accessories. Chromium salts are used in printing, dyeing, and tanning leather. Chromium occurs in massive, granular, or compact forms.
- **Columbium:** Columbium is a rare metal that occurs with the mineral tantalum. Columbium-bearing stainless steel is valuable for its resistance to high temperatures and corrosion.
- **Iron:** The most common use of iron oxides is in the production of iron metal. It is also used for paint, brick and tile, plastics and rubber, pet food, face powder, pharmaceutical capsules, ceramics, and recording tapes and machines. Iron is strongly magnetic and is often identified by a coating of iron oxide (rust) on its surface.
- **Magnesium:** The eighth most abundant element found in the earth's crust, magnesium occurs in several forms, and each is used differently. Magnesium carbonate is used for insulation, magnesium oxide is used as a filler, and magnesium sulfate is used as a fertilizer, rayon coagulant, and in pharmaceuticals.
- **Manganese:** Manganese occurs in unconsolidated deposits such as gravel or clay, as well as in hard rocks. Its primary use is in the ferroalloy industry. Other uses of manganese are in porcelain, dry cell batteries, building brick, floor tile, and plastics. Chemical compounds of manganese are also used in fertilizer, paints, varnishes, livestock feeds, and glass manufacturing.
- **Rare Earth Elements:** Elements found on the periodic table with atomic numbers between 57 and 71 (the lanthanide elements) and yttrium (atomic number 39) are collectively known as the rare earth elements. These elements commonly occur as oxides. Since the category is large it has many uses, including dyeing and printing on fabric, and glass polishing. Rare-earth chlorides are also commonly used as catalysts for petroleum cracking.
- **Thorium:** Thorium is a rare earth metal, and is used in tungsten lamps, refractories resistant to high temperatures, and in gas mantles. The modern use of thorium is in nuclear fuel cells through the creation of fissionable thorium.
- **Titanium:** Titanium is used in oxide form, where its brightness makes it valuable as a pigment. Properties like high refractive index make titanium oxide the best substance for whitening paints, paper, rubber, plastic, and other products. As a metal, titanium has a high strength to weight ratio and is resistant to corrosion, making it useful as a pure metal, to harden steel, and for electrical applications.
- **Uranium:** Uranium occurs in more than 50 rare minerals. In the past, it was used for ceramic glazes and coloring glass. Modern uses include nuclear explosives and as a source of energy.
- **Vanadium:** Vanadium commonly occurs in igneous rocks. It is used to produce steel that is harder, tougher, and more able to resist shock than plain steel. It can also be utilized as a copper alloy. Vanadium salts are used for dyeing, in drugs, and in chemical preparations.

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Map of Industrial Minerals Occurrences in Alaska: Metallic Minerals
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