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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 nonmetallic industrial minerals in Alaska, as determined by a review of published literature. The accompanying information booklet contains bibliographic data for the sources used to generate this map.

Industrial Minerals: Nonmetallic

- **Asbestos:** Asbestos is the name used to describe mineral silicates occurring in nature made of thin, silky fibers. There are many different types of asbestos and many uses including corrugated siding, heat-insulating cements, pipe coverings, adhesives, roofing, ceramics, fertilizers, and paint.
- **Barite:** Barite is a very heavy, light-colored mineral. Its wide range of uses include adhesives, carpet backing, fertilizers, glass, paint, plastics, and welding electrodes. Chemical forms of barite are used in compounds for steel and also in optical glass. Barite is critical to the petroleum industry when used as a heavy mud that supports drill rods in oil- and gas-drilling.
- **Calcium:** Calcium is a major component of marble and limestone, which are used as building materials. Pure calcium is used for adhesives, roofing, carpet backing, ceramics, and glass.
- **Clay:** This earthy, fine grained material is composed mainly of crystalline minerals known as clay minerals. Most clays, when an amount of water is added, can be shaped (a trait known as plasticity) and will hold that shape upon drying. There are some clays that are not plastic. Clay is used in bricks, pottery, and cement manufacturing.
- **Diatomite:** This light, porous aggregate is composed of the fossilized siliceous remains of unicellular aquatic plants called diatoms. Diatomite is very resistant to fire. About fifty percent of diatomite use is in filtration. Other important uses are for insulation, fillers, admixtures in concrete, fertilizers, insecticides, paint, and welding electrodes.
- **Fluorite:** Fluorite occurs most commonly as crystals, and sometimes occurs in granular form. Fluorite is mainly used in chemicals, such as in the preparation of hydrofluoric acid. It is also used in glass manufacturing, enamel, pottery, and in the steel industry.
- **Gemstone:** The main industrial uses of many gemstones are related to their extreme hardness, a property that allows them to be used as abrasives. For example, diamonds are unmatched in their ability to cut hard materials like metal alloys, concrete, and plastic. They are often used in machines to remove nonuniformities in concrete roadways and runways. Gemstones are most widely known for their use in jewelry.
- **Graphite:** Graphite is a soft, black mineral composed of carbon that conducts heat and electricity well. It's earliest known uses were to draw on cave walls and decorate pottery. When graphite is mixed with oil it can be used as a lubricant. When mixed with clay, it is used as the lead in pencils. Graphite is also used in paint, brake and friction applications, fertilizers, and plastics. Foundries, refractories, and the steel industry use graphite as well.
- **Gypsum:** Gypsum is an extremely soft calcium-sulfate mineral that is used in plaster when heat is applied in a process known as calcination, which creates a tightly bonded mass upon setting. It is also used as a soil conditioner for fertilizer.
- **Kyanite:** Kyanite occurs in crystalline and fibrous form. The primary use for kyanite is in the manufacturing of refractory mortars, cements, castables, and plastic ramming mixes. It is also used for electric-furnace linings, ceramic-tiling, welding electrodes, and spark plugs. When kyanite is transparent, it is used as a gemstone.
- **Mica:** The main mica minerals are muscovite, phlogopite, biotite, and lepidolite, all of which share similar physical and chemical properties. They form thin, tough, elastic sheets that have high heat-resistance. Mica minerals are used in electrical and heat insulation, as well as for filler, lubrication, adhesives, roofing, in cattle feed, fertilizers, paint, plastics and rubber, and welding electrodes.
- **Perlite:** Perlite is a glassy, volcanic rock that expands into a lightweight form when treated with high heat. It is used for wall plaster aggregate, lightweight concrete aggregates, lightweight brick, lightweight insulating wallboard, and heat insulation.
- **Phosphate:** Phosphate occurs in a wide variety of natural forms, ranging from a pure granular material to a hard rock. Ninety-five percent of phosphate production is for fertilizers and agriculture purposes. Phosphate is crucial to all living systems and essential for the formation of bones.
- **Pumice:** Pumice is a glassy, volcanic lava that is found near active or recently active, explosive volcanic eruptions. Important properties of pumice include heat and sound insulation, fire resistance, low bulk density, and abrasiveness. Pumice is used as lightweight concrete aggregate for road-surfacing, in cattle feed, fertilizers, paint, and as a polishing and scouring media.
- **Quartz:** Quartz is a very common form of crystalline silica that is hard and may be very transparent. Quartz is used in porcelain, paints, sandpaper, scouring soaps, and wood filler. Quartz is also found in ordinary glass, electrical equipment, optical instruments, and as a gemstone.
- **Silica:** Industrial silica in the form of silica flour, silica gravel, siliceous earth, and silica sand is used for adhesives, roofing, ceramics, construction, glass, paint, and as a drilling medium. These different forms of silica all vary in density.
- **Sulfur:** Sulfur ranks eighth or ninth among the most common elements in the earth's crust. The most important commercial occurrence of sulfur is in sedimentary beds. It is a soft, yellow mineral that is used for making sulfuric acid, fertilizer, paint, iron and steel, coal products, textiles, explosives, and insecticides.
- **Wollastonite:** Wollastonite occurs in fibrous, crystalline, or massive forms and seldom occurs in a pure state. It is used in the production of white mineral wool, floor and wall tile, ceramics, fertilizers, glass, paint, and welding electrodes. Wollastonite is also used in foundries and refractories, and its chemical inertness makes it useful as a filler and reinforcing agent.
- **Zeolites:** These extremely diverse and complex minerals are commonly used in cation exchange processes. Examples of uses include radioactive element absorption, odor control, and wastewater treatment.
- **Zirconium:** Zirconium almost always occurs with hafnium in nature. It is found in some sand and gravel deposits as detrital zircon. Zirconium is used in refractories, metal and alloys, vitreous enamels, electrical and chemical porcelain, pottery glazes, ceramics, fertilizers, foundries, glass, paint, and welding electrodes.

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