Chapter 16 Mining and Mineral Resources

Section 1: Minerals and Mineral Resources

E.Q.: *What are minerals and how do people use them?*

SEV4. Students will understand and describe availability, allocation and conservation of energy and other resources.

a. Differentiate between renewable and nonrenewable resources including how different resources are produced, rates of use, renewal rates, and limitations of sources. Distinguish between natural and produced resources.

b. Describe how technology is increasing the efficiency of utilization and accessibility of resources.

c. Describe how energy and other resource utilization impact the environment and recognize that individuals as well as larger entities (businesses, governments, etc.) have impact on energy efficiency.

d. Describe the relationship of energy consumption and the living standards of societies.

Objectives

- **Define the term *mineral.***
- **Explain the difference between a metal and a nonmetal, and give two examples of each.**
- **Describe three processes by which ore minerals form.**

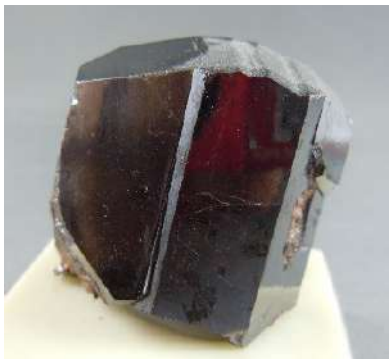
Mineral Resources

- **We depend on the use of mineral resources in almost every aspect of our daily life.**
- **However, our dependence on minerals has not come without a price.**

- **The current challenge is to obtain the minerals that an ever-increasing world population demands at minimal cost to the environment.**

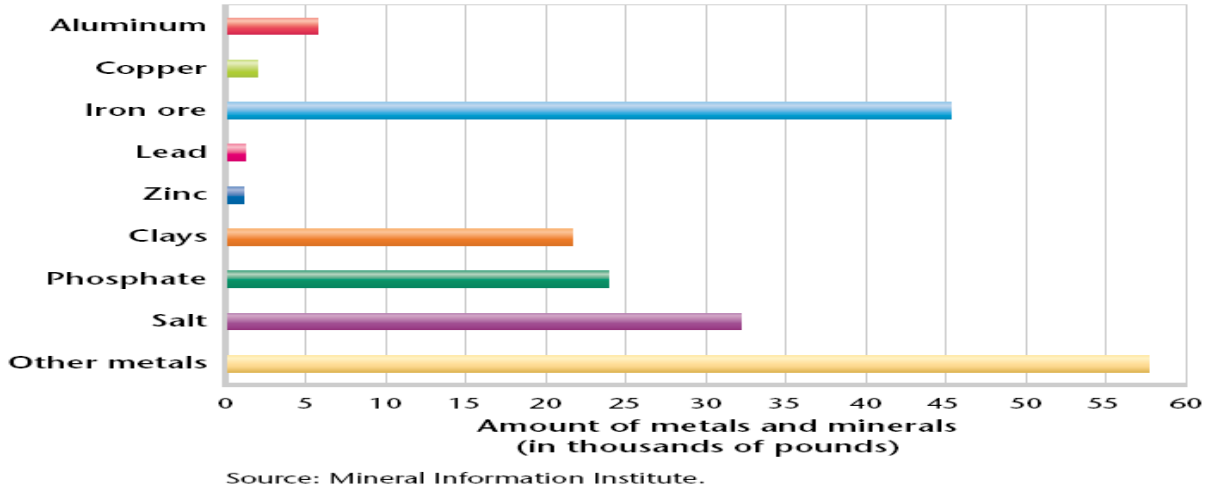
Amethyst
Wilkes County

Quartz
Graves Mountain



Rutile
Graves Mountain

Mineral Consumption per Person (U.S.)



Source: Mineral Information Institute.

What Is a Mineral?

- **A mineral is a naturally occurring, usually inorganic solid that has a characteristic chemical composition, an orderly internal structure, and a characteristic set of physical properties.**
- **Minerals are made up of atoms of a single element, or of compounds*. A* compound consists of atoms of two or more elements chemically bonded together.**

- **The atoms that make up minerals are arranged in regular, repeating geometric patterns.**
- **The arrangement of the atoms, along with the strength of the chemical bonds between them, determine the physical properties of minerals,**
- **Some elements, called *native elements, are considered minerals.* These include the elements gold, silver, and copper.**
- **Most minerals, however, are compounds.**
- **The mineral quartz is made up of silica, which consists of one silicon atom and two oxygen atoms.**

<u>Ore Minerals</u>

- **An ore mineral is a mineral that contains one or more elements of economic value.**
- **During the mining process, gangue minerals, minerals with no commercial value, are extracted along with ore minerals.**
- **Ore minerals, once separated from the gangue minerals, are refined using various methods to extract the valuable elements they contain.**
- **For mining to be profitable, the price of the final product must be greater than the costs of extraction and refining.**

Common Elements and Their Ore Minerals	
Element	**Important ore minerals**
Aluminum (Al)	gibbsite, boehmite, diaspore (bauxite)
Beryllium (Be)	beryl
Chromium (Cr)	chromite
Copper (Cu)	bornite, cuprite, chalcocite, chalcopyrite
Iron (Fe)	goethite, hematite, magnetite, siderite
Lead (Pb)	galena
Manganese (Mn)	psilomelane, pyrolusite
Mercury (Hg)	cinnabar
Molybdenum (Mo)	molybdenite
Nickel (Ni)	pentlandite
Silver (Ag)	acanthite
Tin (Sn)	cassiterite
Titanium (Ti)	ilmenite, rutile
Uranium (U)	carnotite, uraninite
Zinc (Zn)	sphalerite

Aluminum ore

Bauxite is used to make aluminum

Several items are made from recycled aluminum. Some of the most popular items are cement, beverage cans, dishwashers and other aluminum products. Recycled aluminum is also used in other types of items that many people would not think of. These include: makeup products, chemicals and furniture.

Aluminum is originally produced from bauxite, which is a sedimentary rock with various minerals

in it. Bauxite is an important aluminum ore, which is gathered through open pit mining. The water is taken out of the ore, which leaves a white powder called alumina, or aluminum oxide. This material is made into aluminum.

Bauxite is used in cement, beverage cans, dishwashers, siding on houses, makeup, chemicals, and other aluminum products. Recycling aluminum saves approximately 95 percent of the energy it takes to produce more aluminum from bauxite, so now about 30 percent of our aluminum products are made from previously recycled items. It is also an efficient process, which takes as little as 60 days for a can to be collected, melted and made into a new can.

Metallic Minerals

- **Ore minerals are either metallic or nonmetallic.**
- **Metals have the following characteristics:**
  - **can conduct electricity**
  - **have shiny surfaces**
  - **are opaque**
- **Many valuable metallic minerals are native elements, such as gold, silver, and copper.**
- **Other important ore minerals are compounds of metallic minerals with nonmetallic elements.**

Nonmetallic Minerals

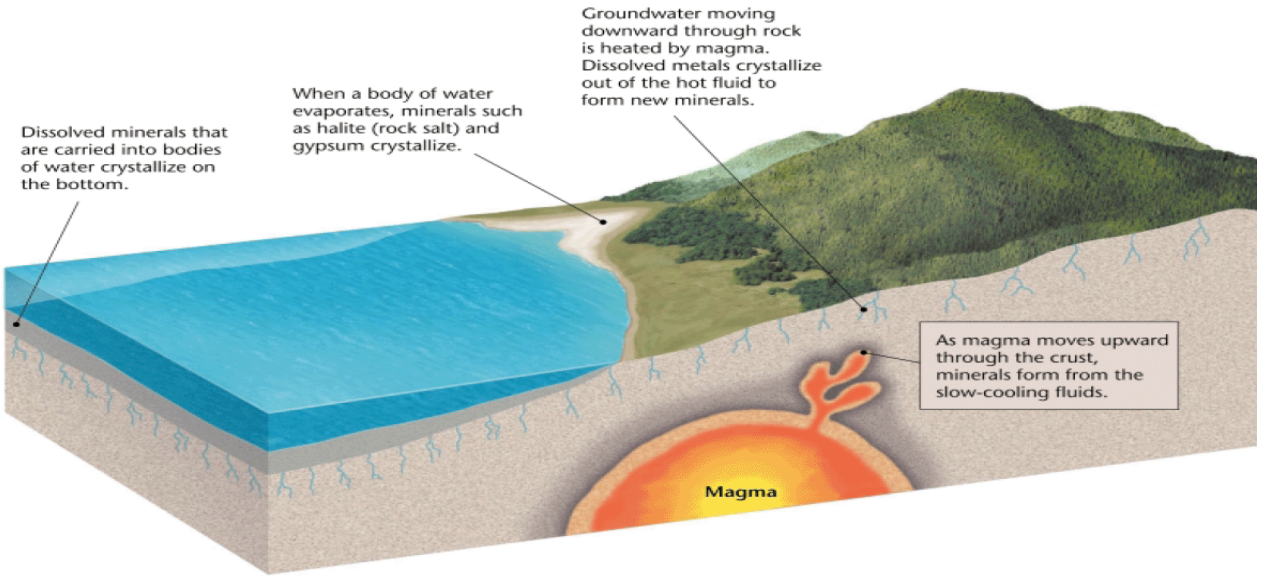
- **Nonmetals have the following characteristics:**
  - **tend to be good insulators**
  - **may have shiny or dull surfaces**
  - **may allow light to pass through**

- **Nonmetallic minerals can also be native elements or compounds.**

How Do Ore Minerals Form?

- **Economically important ore deposits form in a variety of ways, both on and beneath Earth's surface.**
- **The types of mineral that form depend on the environment in which they form.**

Mineral Environments



Hydrothermal Solutions

- **Hot, subsurface waters that contain dissolved minerals are called hydrothermal solutions.**
- **Hydrothermal solutions dissolve minerals as they flow through cracks in rocks.**
- **New minerals crystallize out of these solutions and then fill fractures to form ore deposits called veins.**
- **Many economically valuable metallic ores form in this way.**

Evaporites

- **When water in the seas or lakes evaporate, they leave behind deposits of salts called evaporites.**
- **Evaporites form in arid regions where rates of evaporation are high.**
- **Halite (rock salt) and gypsum are important evaporite minerals.**

Halite

Halite

Halite

Halite

Halite is a non-metallic mineral that has uses that include table salt and road salt. It can also be used in water softeners and as a preservative. It also is used for sodium ore.

Green Gypsum **Gypsum**

Gypsum uses include: manufacture of wallboard, cement, plaster of Paris, soil conditioning, a hardening retarder in Portland cement. Varieties of gypsum known as "satin spar" and "alabaster" are used for a variety of ornamental purposes; however their low hardness limits their durability.

Mineral Resources and Their Uses

- **Certain metals are of major economic and industrial importance.**
- **Some metals can be pounded or pressed into various shapes or stretched very thinly without breaking. Others conduct electricity well.**
- **Often two or more metals are used to form alloys, which combine the most desirous properties of the metals used to make them.**

Uses of Important Metallic and Nonmetallic Elements
Aluminum: cans, foil; windows, doors, siding; appliances, cooking utensils; automobiles, aircraft
Copper: cables, wires; electrical and electronic products; plumbing, heating; alloys; coinage
Gold: computers; communications equipment; spacecraft; dentistry, medicine; jewelry
Iron: steel making
Lead: batteries; ammunition; glass; ceramics
Silicon: computer chips; glass; ceramics
Silver: photography; electrical and electronic products; mirrors; chemistry
Sulfur: Sulfuric acid; gunpowder; rubber; fungicides
Titanium: jet engines, aircraft bodies, spacecraft, missiles; pigments
Zinc: coatings on steel; brass; chemical compounds in rubber and paints

- **Nonmetals are among the most widely used minerals in the world.**
- **Gypsum, for example, is used to make building materials such as wallboard and concrete.**
- **Some nonmetallic minerals include gemstones, prized for their beauty, rarity, or durability.**
- **Important gemstones include diamond, ruby, sapphire, emerald, aquamarine, topaz, and tourmaline.**

List of minerals

From Wikipedia, the free encyclopedia

Gem animals. Click the picture to see a list of the minerals
This is a **list of minerals** for which there are Wikipedia articles. Mineral variety names and mineraloids are to be listed after the valid minerals for each letter. For a complete listing (about 4,000) of all mineral names, see List of minerals (complete).

Contents

Sorted by name:

A

- Abelsonite
- Abenakiite-(Ce)
- Abernathyite
- Abhurite
- Abswurmbachite
- Acanthite
- Actinolite
- Acuminite
- Adamite
- Adamsite-(Y)
- Adelite
- Admontite
- Aegirine
- Aenigmatite
- Aerinite
- Aerugite
- Aeschynite-(Ce)
- Aeschynite-(Nd)
- Aeschynite-(Y)
- Afghanite
- Aksaite
- Alabandite
- Alamosite
- Alarsite
- Albite
- Alforsite
- Algodonite
- Aliettite
- Allabogdanite
- Allanite
- Alloclasite
- Allophane
- Almandine
- Alstonite
- Altaite
- Aluminite
- Aluminium
- Alunite
- Alunogen
- Amblygonite
- Anorthoclase
- Anthophyllite
- Antigorite
- Antimony
- Antitaenite
- Antlerite
- Apatite (mineral group)
- Apophyllite
- Aragonite
- Archerite
- Arctite
- Arcubisite
- Arfvedsonite
- Argutite
- Armalcolite
- Arsenic
- Arsenopyrite
- Arthurite

- Afwillite
- Agardite
- Agrellite
- Agrinierite
- Aguilarite
- Aheylite
- Ahlfeldite
- Aikinite
- Ajoite
- Akaganéite
- Akatoreite
- Akdalaite
- Åkermanite
- Ameghinite
- Amphibole (mineral group)
- Analcite
- Anapaite
- Anatase
- Andalusite
- Andesine
- Andradite
- Anglesite
- Anhydrite
- Ankerite
- Annabergite
- Anorthite
- Artinite
- Artroeite
- Asisite
- Astrophyllite
- Atacamite
- Atheneite
- Aubertite
- Augelite
- Augite
- Aurichalcite
- Auricupride
- Aurostibite
- Autunite
- Axinite (mineral group)
- Azurite

Varieties that are not valid species:

- Agate (variety of quartz)
- Alabaster (variety of gypsum)
- Alexandrite (variety of chrysoberyl)
- Allingite (synonym of amber)
- Alum
- Amazonite (variety of microcline)
- Amber (fossilized resin)
- Amethyst (purple variety of quartz)
- Ammolite (organic; also a gemstone)
- Amosite (asbestiform grunerite)
- Anyolite (metamorphic rock - zoisite, ruby, and hornblende)
- Antozonite (variety of fluorite)
- Aquamarine (light blue variety of beryl)
- Argentite (high temperature form of acanthite)
- Asbestos (fibrous serpentine- or amphibole minerals)
- Avalite (chromian variety of illite.)
- Aventurine (variety of quartz)

B

- Babingtonite
- Baddeleyite
- Baotite
- Barstowite
- Baryte (Barite)
- Barytocalcite
- Bastnäsite (mineral group)
- Bazzite
- Benitoite
- Bensonite
- Bentorite
- Berryite
- Berthierite
- Bertrandite
- Beryl
- Beryllonite
- Biotite

Varieties that are not valid species:

- Bauxite (aluminium ore)
- Beckerite (natural resin)
- Bixbite (red gem variety of beryl)
- Birnessite
- Bismite
- Bismuth
- Bismuthinite
- Bixbyite
- Blödite
- Blossite
- Boehmite
- Boracite
- Borax
- Bornite
- Botryogen
- Boulangerite
- Bournonite
- Brammallite
- Brassite
- Braunite
- Brazilianite
- Breithauptite
- Brewsterite
- Brianite
- Briartite
- Brochantite
- Brookite
- Bromargyrite
- Bromellite
- Bronzite
- Brucite
- Brushite
- Buddingtonite
- Buergerite
- Bukovskyite
- Bytownite

[edit] C

- Cabriite
- Cadmium
- Cafetite
- Calaverite
- Calcite
- Calderite
- Caledonite
- Cancrinite
- Canfieldite
- Carnallite
- Carnotite
- Chalcocite
- Chalcopyrite
- Challacolloite
- Chaoite
- Chapmanite
- Charoite
- Childrenite
- Chlorargyrite
- Chlorastrolite
- Chlorite (mineral group)
- Coesite
- Coffinite
- Colemanite
- Coloradoite
- Columbite (mineral group)
- Combeite
- Connellite
- Cooperite
- Copiapite

- Carobbiite
- Carrollite
- Cassiterite
- Cavansite
- Celadonite
- Celestine
- Celsian
- Cementite
- Cerite
- Cerussite
- Cesbronite
- Ceylonite
- Chabazite
- Chalcanthite
- Chloritoid
- Chondrodite
- Chromite
- Chromium
- Chrysoberyl
- Chrysocolla
- Cinnabar
- Clarkeite
- Clinochrysotile
- Clinoclase
- Clinohedrite
- Clinohumite
- Clinoptilolite
- Clinozoisite
- Clintonite
- Cobaltite
- Copper
- Corderoite
- Cordierite
- Corundum
- Covellite
- Creedite
- Cristobalite
- Crocoite
- Cronstedtite
- Crookesite
- Crossite
- Cryolite
- Cumberlandite
- Cummingtonite
- Cuprite
- Cyanotrichite
- Cylindrite

Native copper

Varieties that are not valid species:

- Carnelian (variety of quartz)
- Chalcedony (cryptocrystalline variety of quartz)
- Chrysolite (gemmy yellow-green forsterite)
- Chrysoprase (green nickel bearing chalcedony)
- Chrysotile (group name - asbestiform serpentine)
- Citrine (yellow variety of quartz)
- Cleveite
- Coltan (short for minerals of the columbite group)

- Crocidolite (asbestiform riebeckite)
- Cymophane (variety of chrysoberyl)

D

The slightly misshapen octahedral shape of this rough diamond crystal in matrix is typical of the mineral.

- Dioptase
- Djurleite
- Dollaseite-(Ce)
- Dolomite
- Domeykite
- Dumortierite

  Varieties that are not valid species:
- Delessite (magnesian chamosite)
- Diatomite (diatomaceous earth)

E

- Edingtonite
- Ekanite
- Elbaite
- Elsmoreite
- Emery (mineral)
- Empressite
- Enargite
- Enstatite
- Eosphorite
- Epidote

  Varieties that are not valid species:
- Emerald (green gem variety of beryl)
- Epsomite
- Erythrite
- Esperite
- Ettringite
- Euchroite
- Euclase
- Eucryptite
- Eudialyte
- Euxenite

F

- Fabianite
- Fichtelite

- Fayalite (olivine group)
- Feldspar (mineral group)
- Feldspathoid (mineral group)
- Ferberite
- Fergusonite
- Feroxyhyte
- Ferrierite (subgroup of zeolite minerals)
- Ferrihydrite
- Ferro-anthophyllite
- Ferrocolumbite
- Ferrohortonolite (olivine group)
- Ferropericlase
- Ferrotantalite
- Fergusonite (mineral group)

Varieties that are not valid species:

- Fassaite Variety of augite
- Ferricrete Iron oxide cemented soil or sediment

- Fluorapatite (apatite group)
- Fluorcaphite
- Fluorichterite (amphibole group)
- Fluorite
- Fluorspar (synonym of fluorite)
- Fornacite
- Forsterite (olivine group)
- Fougerite (layered double hydroxide)
- Franckeite
- Frankhawthorneite
- Franklinite (spinel group)
- Freibergite
- Freieslebenite
- Fukuchilite

G

- Gadolinite (mineral group)
- Gahnite
- Galaxite
- Galena
- Garnet (mineral group)
- Garnierite
- Gaylussite
- Gehlenite
- Geigerite
- Geocronite
- Germanite
- Gersdorffite
- Gibbsite
- Glauconite
- Glaucophane
- Gmelinite
- Goethite
- Gold
- Goslarite
- Graftonite
- Graphite
- Greenockite
- Greigite
- Grossular
- Grunerite
- Guanine
- Gummite

- Gismondine
- Glauberite
- Glaucochroite
- Glaucodot

Varieties that are not valid species:

- Gedanite (fossilized resin)
- Glessite (natural resin)

H

Hanksite, from Searles Lake.

Hematite

- Haggertyite
- Haidingerite
- Halite
- Halloysite
- Halotrichite
- Hanksite
- Hapkeite
- Hardystonite
- Harmotome
- Hauerite
- Hausmannite
- Hauyne
- Hawleyite
- Haxonite
- Herderite
- Hessite
- Hessonite
- Heulandite
- Hibonite
- Hilgardite
- Hisingerite
- Holmquistite
- Homilite
- Hopeite
- Hornblende
- Howlite
- Hübnerite
- Humite
- Gunningite
- Gypsum

- Hazenite
- Heazlewoodite
- Hectorite
- Hedenbergite
- Hellyerite
- Hematite
- Hemimorphite
- Herbertsmithite
- Hutchinsonite
- Hyalophane
- Hydrogrossular
- Hydromagnesite
- Hydroxylapatite
- Hydrozincite
- Hypersthene

Varieties that are not valid species:

- Heliodor (greenish-yellow variety of beryl)
- Heliotrope (variety of chalcedony)
- Hiddenite (variety of spodumene)
- Hyalite (variety of opal)

I

- Ice
- Idocrase (synonym of vesuvianite)
- Idrialite
- Ikaite
- Illite
- Ilmenite
- Ilvaite
- Iodargyrite

J

- Jacobsite
- Jadarite
- Jadeite
- Jamesonite
- Jarosewichite
- Jarosite
- Jennite
- Jeffersonite
- Jerrygibbsite
- Juonniite
- Jurbanite

Varieties that are not valid species:

- Jade (tough, green mineral either jadeite or nephrite amphibole)
- Jasper (variety of quartz)
- Jet (fossilised wood)

K

- Kaatialaite
- Kadyrelite
- Kainite
- Kerolite
- Kieserite
- Kinoite

- Kalininite
- Kalinite
- Kalsilite
- Kamacite
- Kambaldaite
- Kankite
- Kaolinite
- Kassite
- Keilite
- Kermesite
- Kernite
- Knebelite
- Knorringite
- Kobellite
- Kogarkoite
- Kolbeckite
- Kornerupine
- Kratochvilite
- Kremersite
- Krennerite
- Kukharenkoite-(Ce)
- Kutnohorite
- Kyanite

Varieties that are not valid species:

- Keilhauite (variety of titanite)
- Krantzite (natural resin)
- Kunzite (variety of spodumene)

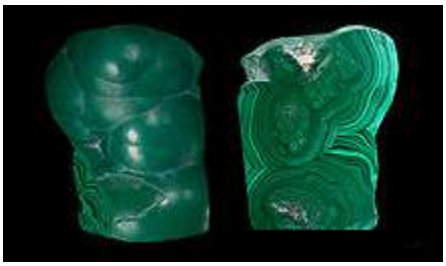
L

- Labradorite
- Lanarkite
- Langbeinite
- Lansfordite
- Lanthanite
- Laumontite
- Laurite
- Lawsonite
- Lazulite
- Lazurite
- Lead
- Leadhillite
- Legrandite
- Lepidocrocite
- Lepidolite
- Leucite
- Leucophanite
- Levyne
- Libethenite
- Linarite
- Liroconite
- Litharge
- Lithiophilite
- Livingstonite
- Lizardite
- Löllingite
- Lonsdaleite
- Loparite-(Ce)
- Lopezite
- Lorandite
- Lorenzenite
- Ludwigite
- Lyonsite

Varieties that are not valid species:

- Lapis lazuli (a rock consisting primarily of lazurite, calcite and pyrite)
- Larimar (blue variety of pectolite)
- Lechatelierite (fused quartz glass)
- Lignite (a type of coal)
- Limonite -(a mineraloid)
- Lodestone (a synonym of magnetite)
- Lublinite variety of calcite

M



A polished slice of Malachite

Muscovite

- Mackinawite
- Maghemite
- Magnesite
- Magnesioferrite
- Magnetite
- Majorite
- Malachite
- Malacolite
- Magnesioferrite
- Manganite
- Manganocolumbite
- Manganotantalite
- Marcasite
- Metacinnabarite
- Metatorbernite
- Miargyrite
- Mica (a group of silicate minerals)
- Microcline
- Microlite
- Millerite
- Mimetite
- Minium
- Mirabilite
- Mixite
- Moganite

- Margaritasite
- Margarite
- Mascagnite
- Massicot
- Matlockite
- McKelveyite
- Meionite
- Melaconite
- Melanite
- Melilite
- Melonite
- Mendozite
- Meneghinite
- Mercury
- Mesolite

Varieties that are not valid species:

- Magnesia
- Mariposite (variety of phengite/muscovite)
- Menilite (variety of opal)
- Meerschaum (variety of sepiolite)
- Milky quartz (a cloudy white quartz)
- Morganite (a pink beryl)
- Mohite
- Moissanite
- Molybdenite
- Monazite
- Monohydrocalcite
- Monticellite
- Montmorillonite (clay mineral)
- Moolooite
- Mordenite
- Mottramite
- Mullite
- Murdochite
- Muscovite

N

- Nabesite
- Nacrite
- Nagyagite
- Nahcolite
- Native copper
- Natrolite
- Natron
- Natrophilite
- Nekrasovite
- Nelenite
- Nenadkevichite
- Nepheline
- Nephrite
- Nickel
- Nickeline
- Niedermayrite
- Niningerite
- Niobite (synonym of columbite)
- Niobite-tantalite (synonym of columbite-tantalite)
- Nissonite
- Nitratine
- Nitre
- Nontronite

- Neptunite
- Nosean
- Nsutite
- Nyerereite

O

- Oligoclase
- Olivine (a group of silicate minerals)
- Olivenite
- Omphacite
- Ordonezite
- Oregonite
- Orpiment
- Orthochrysotile
- Orthoclase
- Osarizawaite
- Osmium
- Osumilite
- Otavite
- Ottrelite
- Overite

Opal

Varieties that are not valid species:

- Onyx (a monochromatic banded variety of chalcedony)
- Opal

P

- Painite
- Palladium
- Palygorskite
- Papagoite
- Parachrysotile
- Paragonite
- Plagioclase Na-Ca feldspar
- Platinum
- Polarite
- Pollucite
- Polybasite

- Pararealgar
- Parisite
- Partheite
- Pectolite
- Pelagosite
- Pentlandite
- Periclase
- Perovskite
- Petalite
- Petzite
- Pezzottaite
- Pharmacosiderite
- Phenakite
- Phillipsite
- Phlogopite
- Phoenicochroite
- Phosgenite
- Phosphophyllite
- Pigeonite
- Potassium alum
- Polycrase
- Polydymite
- Polyhalite
- Powellite
- Prehnite
- Proustite
- Psilomelane
- Purpurite
- Pumpellyite
- Pyrargyrite
- Pyrite
- Pyrochlore
- Pyrolusite
- Pyromorphite
- Pyrope
- Pyrophyllite
- Pyroxene (group of silicate minerals)
- Pyroxferroite
- Pyrrhotite

Varieties that are not valid species:

- Palagonite (basaltic volcanic glass)
- Perlite (volcanic glass)
- Phosphorite (name given to impure, massive apatite.)
- Plessite (mixture of kamacite and taenite)
- Pitchblende (a massive impure form of uraninite)
- Pumicite (synonym of pumice)

Q

Quartz

- Quartz
- Quenstedtite

R

- Rambergite
- Rammelsbergite
- Raspite
- Realgar
- Renierite
- Rheniite
- Rhodium
- Rhodochrosite
- Rhodonite
- Rhomboclase
- Rickardite
- Riebeckite
- Romanèchite
- Robertsite
- Rosasite
- Roscoelite
- Rosenbergite
- Routhierite
- Ruthenium
- Rutherfordine
- Rutile
- Rynersonite

Varieties that are not valid species:

- Rock crystal (quartz)
- Rose quartz
- Roumanite (amber)
- Ruby (red gem corundum)

S

- Sabatierite
- Sabieite
- Sabinaite
- Safflorite
- Sal ammoniac
- Saliotite
- Samarskite
- Samsonite
- Sanbornite
- Saneroite
- Sanidine (orthoclase variety)
- Santite
- Seamanite
- Seeligerite
- Segelerite
- Sekaninaite
- Selenite
- Selenium
- Seligmannite
- Sellaite
- Senarmontite
- Sepiolite
- Serpentine group
- Shattuckite
- Siderite
- Sperrylite
- Spessartite
- Sphalerite
- Sphene
- Spinel
- Spodumene
- Spurrite
- Stannite
- Staurolite
- Steacyite
- Steatite (talc)
- Stephanite
- Stibnite
- Stichtite

- Saponite (clay mineral)
- Sapphirine
- Sassolite
- Sauconite
- Scapolite (a group of silicate minerals)
- Scheelite
- Schoepite
- Schorl (black tourmaline)
- Schreibersite
- Schwertmannite
- Scolecite
- Scorodite
- Scorzalite

Varieties that are not valid species:

- Sapphire (gem corundum of any color except red, especially blue varieties)
- Sard (a variety of chalcedony/quartz)
- Satinspar (a variety of Gypsum)
- Smoky quartz (a brown or black variety of quartz)
- Soapstone (a rock)
- Spectrolite (a variety of labradorite)
- Stantienite (a variety of amber)

- Siderotil
- Siegenite
- Sillimanite
- Silver
- Simetite
- Simonellite
- Skutterudite
- Smaltite
- Smectite
- Smithsonite
- Soda niter
- Sodalite

- Stilbite
- Stilleite
- Stolzite
- Stromeyerite
- Strontianite
- Struvite
- Studtite
- Sugilite
- Sulfur
- Sussexite
- Sylvanite
- Sylvite

T

Massive turquoise in matrix with quartz from Mineral Park, Arizona.

- Tachyhydrite
- Taenite
- Talc
- Tantalite
- Tantite
- Tanzanite
- Tarapacaite
- Tausonite
- Teallite
- Tellurite
- Tellurium
- Tellurobismuthite
- Temagamite
- Tennantite
- Tenorite
- Tephroite
- Terlinguaite
- Teruggite
- Tetradymite
- Tetrahedrite
- Thaumasite
- Thenardite
- Thomasclarkite
- Thomsenolite
- Thorianite
- Thorite
- Thortveitite
- Thuringite
- Tiemannite
- Tin
- Tincalconite
- Titanite
- Titanowodginite
- Todorokite
- Tokyoite
- Topaz
- Tobermorite
- Torbernite
- Tourmaline (group of silicate minerals)
- Tremolite
- Trevorite
- Tridymite
- Triphylite
- Triplite
- Triploidite
- Tripuhyite
- Trona
- Tsavorite
- Tschermigite
- Tugtupite
- Tungstite
- Tyrolite
- Turquoise
- Tusionite
- Tyuyamunite

Varieties that are not valid species:

- Tanzanite (variety of Zoisite)
- Thulite (variety of Zoisite)
- Travertine (form of calcium carbonate)
- Tsavorite (gem variety of grossularite garnet)

U

- Uchucchacuaite
- Uklonskovite
- Ulexite
- Ullmannite
- Ulvospinel
- Umangite
- Umber
- Umbite
- Upalite
- Uraninite
- Uranophane
- Uranopilite
- Uvarovite

Varieties that are not valid species:

- Ultramarine
- Unakite, a rock composed of feldspar, epidote and quartz
- Uralite alteration actinolite

V

- Vaesite
- Valentinite
- Vanadinite
- Variscite
- Vaterite
- Vauquelinite
- Vauxite
- Vermiculite
- Vesuvianite
- Villiaumite
- Violarite
- Vivianite
- Volborthite

W

- Wagnerite
- Wardite
- Warikahnite
- Warwickite
- Wassonite
- Wavellite
- Weddellite
- Weilite
- Weissite
- Weloganite
- Whewellite
- Whitlockite
- Willemite
- Wiluite
- Witherite
- Wolframite
- Wollastonite
- Wulfenite
- Wurtzite
- Wüstite
- Wyartite

Varieties that are not valid species:

- Wad

X

- Xenotime
- Xifengite

- Xonotlite

Y

- Ye'elimite
- Yttrialite
- Yttrocerite
- Yttrocolumbite

Z

- Zabuyelite
- Zaccagnaite
- Zaherite
- Zajacite-(Ce)
- Zakharovite
- Zanazziite
- Zaratite
- Zeolite (group of silicate minerals)
- Zhanghengite
- Zharchikhite
- Zektzerite
- Zhemchuzhnikovite
- Zhonghuacerite-(Ce)
- Ziesite
- Zimbabweite
- Zinalsite
- Zinc-melanterite
- Zincite
- Zincobotryogen
- Zincochromite
- Zinkenite
- Zinnwaldite
- Zippeite
- Zircon
- Zirconolite
- Zircophyllite
- Zirkelite
- Zoisite
- Zunyite