U.S. Department of the Interior
U.S. Geological Survey

MINERAL COMMODITY SUMMARIES 2009

Abrasives
Aluminum
Antimony
Arsenic
Asbestos
Barite
Bauxite
Beryllium
Bismuth
Boron
Bromine
Cadmium
Cement
Cesium
Chromium
Clays
Cobalt
Copper
Diamond
Diatomite
Feldspar
Fluorspar
Gallium
Garnet
Gemstones
Germanium
Gold
Graphite
Gypsum
Hafnium
Helium
Indium
Iodine
Iron Ore
Iron and Steel
Kyanite
Lead
Lime
Lithium
Magnesium
Manganese
Mercury
Mica
Molybdenum
Nickel
Niobium
Nitrogen
Peat
Perlite
Phosphate Rock
Platinum
Potash
Pumice
Quartz Crystal
Rare Earths
Rhenium
Rubidium
Salt
Sand and Gravel
Scandium
Selenium
Silicon
Silver
Soda Ash
Sodium Sulfate
Stone
Strontium
Sulfur
Talc
Tantalum
Tellurium
Thallium
Thorium
Tin
Titanium
Tungsten
Vanadium
Vermiculite
Yttrium
Zinc
Zirconium

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RUBIDIUM

(Data in kilograms of rubidium content unless otherwise noted)

Domestic Production and Use: Worldwide, rubidium occurrences may be associated with zoned pegmatites in the minerals pollucite, a source of cesium, or lepidolite, a source of lithium. Rubidium is not mined in the United States; however, rubidium concentrate is imported from Canada for processing in the United States. There are rubidium occurrences in Maine and South Dakota, and rubidium may also be found with some evaporite minerals in other States. Applications for rubidium and its compounds include photoelectrics, specialty glass, pyrotechnics, and as standards for atomic absorption analysis. Rubidium-rich feldspars are used in ceramic applications for spark plugs and electrical insulators because of their high dielectric capacity. Other applications include the use of high-purity rubidium (>98%) in vapor cells as a wavelength reference, and use as a substitute for cesium as a frequency standard in atomic clocks. Rubidium-82, an isotope of rubidium, is used to trace blood flow in the heart. Rubidium-87, a natural decay product of strontium-82, may be extracted from potassium-bearing minerals, such as micas, and used for dating episodes of heating and deformation in rocks.

Salient Statistics—United States: One mine in Canada produced byproduct rubidium concentrate, which was then imported into the United States for processing. Production data from the Canadian mine, and U.S. consumption, export, and import data, are not available. In the United States, consumption of rubidium may amount to only a few thousand kilograms per year. No market price is available because the metal is not traded. In 2008, one company offered 1-gram ampoules of 99.75%-grade rubidium (metals basis) at $60.80 each, and the price for 100 grams of the same material was $1,168.00. This is a 4.5% increase from that of 2007.

Recycling: None.

Import Sources (2004-07): The United States is 100% import reliant on byproduct rubidium concentrate imported from Canada.

Tariff: Item	Number	Normal Trade Relations 12-31-08
Alkali metals, other	2805.19.9000	5.5% ad val.

Depletion Allowance: 14% (Domestic and foreign).

Government Stockpile: None.

Prepared by **Désirée E. Polyak [(703) 648-4909, dpolyak@usgs.gov, fax: (703) 648-7757]**

RUBIDIUM

Events, Trends, and Issues: Rubidium has been available commercially as a byproduct of lithium chemicals production for 40 years. Demand is limited by the lack of supply, but discovery of new resources of rubidium, increases in lithium exploration, as well as higher grade rubidium discoveries, may create new supplies leading to expanded commercial applications. The use of rubidium as an atomic clock for global positioning satellites continues to increase. The stability of the rubidium clock is so great that it would lose only 3 seconds in 1 million years. Rubidium carbonate glass has been extensively tested for use in anticollision devices for motor vehicles. The role of rubidium-82 and positron emission tomography (PET) in the evaluation and care of patients with suspected coronary artery disease is evolving in conjunction with advances in PET instrumentation, data analysis, and clinical research. Rubidium forms interesting amalgams with mercury and alloys with gold, properties that may expand usage. Small amounts of rubidium are released into the atmosphere during coal combustion; however, there have been no adverse environmental or human health issues associated with the processing or use of rubidium.

World Mine Production, Reserves, and Reserve Base:[1] There are no minerals in which rubidium is the predominant metallic element; however, rubidium may be taken up in trace amounts in the lattices of potassium feldspars and micas during the crystallization of some pegmatites. The rubidium-bearing minerals lepidolite and pollucite may be found in some zoned pegmatites, which are exceptionally coarse-grained plutonic rocks that form late in the crystallization of a silicic magma. Lepidolite, a lithium-bearing mica, is the principal ore mineral of rubidium and may contain up to 3.15% rubidium. Pollucite, a cesium aluminosilicate mineral, may contain up to 1.35% rubidium.

World Resources: Rubidium-bearing zoned pegmatites are known in several locations in Canada, and there are also pegmatite occurrences in Afghanistan, Namibia, Peru, Zambia, and other countries. Minor amounts of rubidium are reported in brines in northern Chile and China and in evaporites in France, Germany, and the United States (New Mexico and Utah). World resources of rubidium are unknown.

Substitutes: Rubidium and cesium are close together on the periodic table, have similar atomic radii, and, therefore, have similar physical properties. These metals may be used interchangeably in many applications.

[1]See Appendix C for definitions.