

## 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 biomedical research, photoelectrics, specialty glass, and pyrotechnics. Rubidium is used as an atomic resonance frequency standard in atomic clocks, playing a vital role in global positioning systems (GPS). 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. 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 2009, one company offered 1-gram ampoules of 99.75%-grade rubidium (metals basis) at \$68.40 each, a 12.5% increase from that of 2008. The price for 100 grams of the same material was \$1,258.00, a 7.7% increase from that of 2008.

**Recycling:** None.

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

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations</b>
			<b><u>12-31-09</u></b>
	Alkali metals, other	2805.19.9000	5.5% ad val.

**Depletion Allowance:** 14% (Domestic and foreign).

**Government Stockpile:** None.

## 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 sources 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 in atomic clocks for GPS continues to increase. Rubidium carbonate glass has been extensively tested for use in anticollision devices for motor vehicles. The use of rubidium-82 positron emission tomography (PET) combined with computed tomography angiography (CT) in the evaluation and care of patients with suspected coronary artery disease continues to increase. Advances have been made in the use of rubidium in quantum computing. 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 and Reserves:**<sup>1</sup> 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, Russia, and Zambia. 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 in proximity in the periodic table of the elements, have similar atomic radii, and, therefore, have similar physical properties. These metals may be used interchangeably in many applications.

<sup>1</sup>See [Appendix C for definitions](#). Reserve base estimates were discontinued in 2009; see [Introduction](#).