

RUBIDIUM

(Data in kilograms of rubidium content unless otherwise noted)

Domestic Production and Use: Rubidium is not mined in the United States; however, occurrences are known in Maine and South Dakota, and rubidium is associated with some evaporite mineral occurrences in other States. Rubidium concentrate is imported from Canada for processing in the United States. Applications for rubidium and its compounds include biomedical research, electronics, specialty glass, and pyrotechnics. Biomedical applications include rubidium salts used in the treatment of epilepsy and rubidium-82 used as a blood-flow tracer. Rubidium is used to generate electricity in some photoelectric cells, commonly referred to as solar panels, or as an electrical signal generator in motion sensor devices. Rubidium is used in gas cell oscillators, which are required as an atomic resonance frequency standard in some 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.

Salient Statistics—United States: U.S. salient statistics, such as consumption, exports, and imports, are not available. One mine in Canada produced rubidium ore as a byproduct, which was processed as concentrate; however, production data for that mine are not available. Part of that concentrate was exported to the United States for further processing. No market price for rubidium is published because the metal is not traded in commercial quantities. In 2013, one company offered 1-gram ampoules of 99.75%-grade rubidium (metal basis) for \$77.20 and 100 grams ampoules of the same material for \$1,415.00, a 3.5% increase from that of 2012. The price for 10 grams of 99.8% rubidium formate hydrate (metal basis) was \$54.00.

Recycling: None.

Import Sources (2009–12): The United States is 100% import reliant on byproduct rubidium concentrate imports, most of which is thought to be imported from Canada.

<u>Tariff:</u>	<u>Item</u>	<u>Number</u>	<u>Normal Trade Relations</u>
			<u>12–31–13</u>
	Alkali metals, other	2805.19.9000	5.5% ad val.

Depletion Allowance: 14% (Domestic and foreign).

Government Stockpile: None.

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Events, Trends, and Issues: Rubidium has been commercially available as a byproduct of lithium chemicals production for 40 years. The use of rubidium was primarily in chemical, medical, and electronics research. The use of rubidium in atomic clocks continued to increase, with emphasis on new ultra-accurate atomic clocks. Research into the use of rubidium in superconductors was increasing. A process for routinely producing Bose-Einstein Condensates (BEC) using rubidium was developed for the first time outside of government and university laboratories, making BEC available for research and uses in commercial applications. Rubidium was used in systems designed as quantum computing devices, which improved calculations and response times in comparison to less-advanced systems. Quantum computers have the potential to be useful in creating and testing radar, space, and aircraft systems.

In medical applications, the use of rubidium-82 positron emission tomography (PET) combined with computed tomography angiography (CTA) in the evaluation and care of patients with suspected coronary artery disease continued to increase. Improvements in PET/CT scanning machines could lead to the replacement of technetium-99 with rubidium-82 as a safer, efficient, and stable component.

World Mine Production and Reserves: No minerals exist 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 pegmatites. The rubidium-bearing minerals lepidolite and pollucite may be found in zoned pegmatites, which are exceptionally coarse-grained plutonic rocks that formed late in the crystallization of a silicic magma. Lepidolite, the principal source of rubidium, can contain up to 3.5% rubidium oxide, and pollucite contains up to 1.5% rubidium oxide.

	Reserves¹
Canada	110,000,000
Other countries	<u>NA</u>
World total	NA

World Resources: World resources of rubidium are unknown. In addition to several significant rubidium-bearing zoned pegmatites in Canada, pegmatite occurrences have been identified in Afghanistan, Namibia, Peru, Russia, the United States, 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).

Substitutes: Rubidium and cesium have similar physical properties and may be used interchangeably in many applications; however, cesium is a preferred material in many applications because it is more electropositive than rubidium.

NA Not available.

¹[See Appendix C for resource/reserve definitions and information concerning data sources.](#)