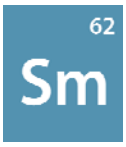
Stable isotopes of samarium available from ISOFLEX

Isotope	Z(p)	N(n)	Atomic Mass	Natural Abundance	Enrichment Level	Chemical Form
Sm-144	62	82	143.911996	3.10%	88.00-93.00%	Oxide
Sm-147	62	85	146.914894	15.0%	94.00-96.50%	Oxide
Sm-148	62	86	147.914818	11.30%	91.00-96.50%	Oxide
Sm-149	62	87	148.917180	13.80%	>94.00%	Oxide
Sm-150	62	88	149.917272	7.40%	>94.00%	Oxide
Sm-152	62	90	151.919729	26.70%	≥98.40%	Oxide
Sm-154	62	92	153.922206	22.70%	>98.50%	Oxide



Samarium was discovered in 1879 by Paul-Émile Lecoq de Boisbaudran. It is named for the mineral *samarskite,* from which Lecoq de Boisbaudran isolated the new element. The mineral in turn takes its name from Vasili Samarsky-Bykhovets, the one-time chief of staff of the Russian Corps of Mining Engineers.

Samarium is a hard, brittle, yellow metal, which quickly develops an oxide film in air. Its hardness is similar to that of iron. It exhibits two crystal forms: an *alpha form,* with a rhombohedral crystal structure at ordinary temperatures, changes to the body-centered *cubic form* at 917 ºC. The densities of the two forms are 7.52 g/cm^3 and 7.40 g/cm^3, respectively. Samarium is insoluble in water and soluble in acid. It is stable in dry air at ordinary temperatures; however, it oxidizes in moist air, forming an oxide coating. The metal ignites in air at about 150 ºC. It is an active reducing agent (it reduces several metal oxides to metals), and it liberates hydrogen from water. Among samarium's trivalent salts, the sesquioxide is commercially important, and the divalent compounds are primarily halides. The trivalent salts of these halogens are more stable than their divalent counterparts.

Samarium salts are used in optical glass, capacitors, thermoionic generating devices and sensitizers of phosphors. The metal is doped with calcium fluoride crystals for use in lasers. It is also used with other rare earths for carbon-arc lighting. Its alloys are used in permanent magnets.

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Properties of Samarium

Name	Samarium
Symbol	Sm
Atomic number	62
Atomic weight	150.36
Standard state	Solid at 298 °K
CAS Registry ID	7440-19-9
Group in periodic table	N/A
Group name	Lanthanoid
Period in periodic table	6 (Lanthanoid)
Block in periodic table	f-block
Color	Silvery white
Classification	Metallic
Melting point	1074 °C
Boiling point	1791 °C
Vaporization point	1791 °C
Thermal conductivity	13.30 W/(m·K) at 298.2 °K
Electrical resistivity	94.00 μΩ·cm at 25 °C
Electronegativity	1.2
Specific heat	0.18 J/g mol at 20 °C
Heat of vaporization	175.00 $kJ \cdot mol^{-1}$ at 1791 °C
Heat of fusion	8.90 $kJ \cdot mol^{-1}$
Density of liquid	7.16 g/cm^3 at 1074 °C
Density of solid	7.52 g/cm^3
Electron configuration	$[Xe]4f^6 6s^2$
Atomic radius	1.804 Å
Ionic radius	Sm^{3+}: 1.08 Å (coordination number 8)
Oxidation states	+2, +3

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