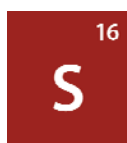


Stable isotopes of sulfur available from ISOFLEX

Isotope	Z(p)	N(n)	Atomic Mass	Natural Abundance	Enrichment Level	Chemical Form
S-32	16	16	31.97207070	94.99%	99.99%	Elemental
S-33	16	17	32.9714585	0.75%	>99.30%	Elemental
S-34	16	18	33.9678669	4.25%	>99.00%	Elemental
S-36	16	20	35.9670809	0.01%	55.00-99.20%	Elemental



Sulfur (also known as “sulphur”) has been known since ancient times and was referred to in Genesis as “brimstone.” Assyrian texts dated around 700-600 BC refer to it as the “product of the riverside,” where deposits could be found. Its name has origins in the Sanskrit word *sulvere* and the Latin word *sulphurum*, both meaning “sulfur.”

Sulfur, particularly in its S₈ form, is insoluble in water but dissolves in carbon disulfide, anhydrous liquid ammonia and methylene iodide. It is moderately soluble in benzene, toluene, chloroform and acetone, its solubility increasing with temperature. Solid polymeric sulfur is practically insoluble in all solvents.

Sulfur exists in several allotropic forms: at ordinary temperatures it exists as thermodynamically stable *alpha-cyclooctasulfur*, which has two other modifications, the *beta* and the *gamma* forms. *Alpha-cyclooctasulfur*, or the alpha sulfur, is a yellow orthorhombic crystalline solid. It has a density of 2.07 g/cm³ at 20 °C and is stable at ordinary temperatures. *Beta-sulfur* has pale yellow, opaque, needle-like crystals with a monoclinic structure that is brittle. It is stable between 94.5 °C and 120 °C and converts to an orthorhombic form on standing. It has a density of 1.96 g/cm³ and melts at 115.2 °C. *Gamma-sulfur*, a pale yellow amorphous solid, is a second monoclinic form of cyclooctasulfur. It has a density of 1.92 g/cm³ and melts at 120 °C. There are also various other forms of sulfur including cyclohexa-, cyclohepta-, cyclonona-, cyclodeca- and cyclododeca-sulfur.

Elemental sulfur is used for vulcanizing rubber, in making black gunpowder, as a soil conditioner, as a fungicide, preparing a number of metal sulfides, and producing carbon disulfide. It is also used in matches; for bleaching wood pulp, straw, silk and wool; and in the synthesis of many dyes. Pharmaceutical-grade precipitated and sublimed sulfurs are used as scabides and as antiseptics in lotions and ointments.

Properties of Sulfur

Name	Sulfur
Symbol	S
Atomic number	16
Atomic weight	32.06
Standard state	Solid at 298 °K

Properties of Sulfur (continued)

CAS Registry ID	7704-34-9
Group in periodic table	16
Group name	Chalcogen
Period in periodic table	3
Block in periodic table	p-block
Color	Lemon yellow
Classification	Nonmetallic
Melting point	115.21 °C
Boiling point	444.72 °C
Thermal conductivity	0.205 W/(m·K)
Electrical resistivity	$>1023 \times 10^{-8} \Omega\text{m}$
Electronegativity	2.58
Heat of vaporization	9.8 kJ·mol ⁻¹
Heat of fusion	1.73 kJ·mol ⁻¹
Density of solid	1.96 g/cm ³
Electron configuration	[Ne]3s ² 3p ⁴
Atomic radius	1.03 Å
Ionic radii	0.37 Å for S ⁴⁺ (coordination number 6) and S ⁶⁺ (coordination number 4); 0.29 Å for hexacoordinated S ⁶⁺ in crystals
Oxidation states	+2, +4, +6