

Stable isotopes of oxygen available from ISOFLEX

Isotope	Z(p)	N(n)	Atomic Mass	Natural Abundance	Enrichment Level	Chemical Form
O-16	8	8	15.994914622	99.76%	99.99%	Water
O-18	8	10	17.999160	0.20%	≥97.00%	Water



Oxygen was discovered in 1774 by Joseph Priestley and Carl Scheele, in England and Sweden. Its name derives from the Greek words *oxy* + *genes*, meaning “acid” (sharp) and “forming” or “creating.”

A colorless, odorless, tasteless gas, oxygen reacts with practically all elements, a number of inorganic salts, and all organics under various conditions, including elevated temperatures and pressures, or in the presence of a catalyst. While certain metals — such as sodium, potassium and calcium — react vigorously with oxygen at ordinary temperatures, most other metals react with it at elevated temperatures. All nonmetals except helium, neon and argon react with oxygen.

Oxygen is present in all living organisms and is vital for sustenance of life in the animal kingdom. Most oxygen manufactured today is consumed in refining iron in the steel industry, removing carbon, silicon, sulfur, phosphorous, manganese and other impurities from liquid iron. It is also used to enrich fuel-air flame in furnaces that produce copper and nickel from sulfide ores.

Oxygen also has major uses in the chemical industry for the oxidation of methane, ethylene and other hydrocarbons. It is used in all breathing masks and life-support devices, respirators and incubators. In medicine it is also administered under hypoxia, respiratory distress, impaired respiratory function, asthma attacks, for the treatment of cyanosis, and for poisoning by carbon monoxide and other toxicants. Oxygen is also used in fermentation, the bleaching of wood chips, odor control, and as a flame-enhancing agent.

Properties of Oxygen

Name	Oxygen
Symbol	O
Atomic number	8
Atomic weight	15.9994
Standard state	Gas at 298 °K
CAS Registry ID	7782-44-7
Group in periodic table	16

Properties of Oxygen (continued)

Group name	Chalcogen
Period in periodic table	2
Block in periodic table	p-block
Color	Colorless gas; pale blue liquid
Classification	Nonmetallic
Melting point	-218.3 °C
Boiling point	-182.9 °C
Thermal conductivity	0.02658 W/(m·K)
Electronegativity	3.44
Heat of vaporization	3.41 (per mole O atoms) kJ·mol ⁻¹
Heat of fusion	0.222 (per mole O atoms) kJ·mol ⁻¹
Density of gas	0.001429 g/cm ³ at 0 °C
Density of solid	1.495 g/cm ³
Density of liquid	1.14 g/cm ³
Ground state electron configuration	[He]2s ² 2p ⁴
Bond length	1.48 Å
Oxidation states	-2, -1
Atomic radius	0.73 Å
Ionic radius	O ²⁻ : 1.40 Å
Critical temperature	-118.56 °C
Critical pressure	49.77 atm
Critical volume	73 cm ³ /mol
Diffusion coefficient in air	0.178 cm ² /sec at STP