

Fluorine

Fluorine is a [chemical element](#) with the [symbol](#) **F** and [atomic number](#) 9. It is the lightest [halogen](#) and exists as a highly toxic pale yellow [diatomic](#) gas at [standard conditions](#). As the most [electronegative](#) element, it is extremely reactive, as it reacts with all other elements, except for argon, neon, and helium.

Among the elements, fluorine ranks [24th in universal abundance and 13th in terrestrial abundance](#). [Fluorite](#), the primary mineral source of fluorine which gave the element its name, was first described in 1529; as it was added to metal ores to lower their melting points for [smelting](#), the Latin verb *fluo* meaning "flow" gave the mineral its name. Proposed as an element in 1810, fluorine proved difficult and dangerous to separate from its compounds, and several early experimenters died or sustained injuries from their attempts. Only in 1886 did French chemist [Henri Moissan](#) isolate elemental fluorine using low-temperature [electrolysis](#), a process still employed for modern production. Industrial production of fluorine gas for [uranium enrichment](#), its largest application, began during the [Manhattan Project](#) in [World War II](#).

Owing to the expense of refining pure fluorine, most commercial applications use fluorine compounds, with about half of mined fluorite used in [steelmaking](#). The rest of the fluorite is converted into corrosive [hydrogen fluoride](#) en route to various organic fluorides, or into [cryolite](#), which plays a key role in [aluminium refining](#). Molecules containing a [carbon–fluorine bond](#) often have very high chemical and thermal stability; their major uses are as [refrigerants](#), electrical insulation and cookware, the last as [PTFE](#) (Teflon). Pharmaceuticals such as [atorvastatin](#) and [fluoxetine](#) contain C–F bonds. The [fluoride ion](#) from dissolved fluoride salts inhibits dental cavities, and so finds use in [toothpaste](#) and [water fluoridation](#). [Global fluorochemical](#) sales amount to more than [US\\$15 billion](#) a year.

[Fluorocarbon](#) gases are generally [greenhouse gases](#) with [global-warming potentials](#) 100 to 23,500 times that of [carbon dioxide](#), SF_6 having the highest global warming potential of any known substance. [Organofluorine compounds](#) often persist in the environment due to the strength of the [carbon–fluorine bond](#). Fluorine has no known metabolic role in mammals; a few [plants](#) and [sea sponges](#) synthesize organofluorine poisons (most often [monofluoroacetates](#)) that help deter predation.^[13]