

ARSENIC

Atomic Number **33**

Chemical Symbol **As**

Group **VA—Metalloid**

IA																		VIII A							
H	He																	B	C	N	O	F	Ne		
Li	Be											VIII B								Al	Si	P	S	Cl	Ar
Na	Mg	III B	IV B	V B	VIB	VII B							IB	II B	Ga	Ge	As	Se	Br	Kr					
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr								
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe								
Cs	Ba	*La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn								
Fr	Ra	†Ac	Rf	Db	Sg	Bh	Hs	Mt	Uun	Uuu	Uub							Uuq							

* Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
† Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

As

Arsenic is a brittle, crystalline solid at room temperature. Lying between the nonmetals and metals in the periodic table, it is often thought of as a semimetal, or metalloid. For example, it is a poor conductor of electricity, yet it has a steel-gray color. When exposed to air, arsenic quickly tarnishes to a yellow color, eventually turning black.

Although a small amount of arsenic does occur in its free form in nature, most arsenic is found in a number of mineral compounds such as realgar and orpiment. Both are compounds of arsenic and sulfur. The history of arsenic dates back to ancient Greek and Roman times. Its name is probably derived from the Latin name *arsenicum* for orpiment, a common yellow pigment used at the time.

Arsenic is recovered from a mineral such as orpiment, which has a color almost like that of gold, by first roasting it in air to convert the arsenic to an oxide. The oxide is then heated with carbon to remove the oxygen and liberate the arsenic.

In the form of arsenious oxide, a white crystalline powder compound that is also known as white arsenic or arsenic trioxide, arsenic is a well-known poison. It is used as a weed killer and insecticide, being commonly sprayed on fruit to ward off damage by insects. The insecticide called Paris green also contains arsenic and is often sprayed from airplanes over cotton fields to destroy boll-weevil infestations.

Arsenic as a poison has captured the imagination of many a crime writer. The popularity of arsenic as an instrument of murder does have some basis in fact. Before recent advances in autopsy techniques, it was often impossible to detect arsenic in



In *Arsenic and Old Lace*, Cary Grant came across two old women who use arsenic to poison their house guests.

the body of a victim. The victim died with symptoms resembling those of pneumonia. Because arsenic is dangerous, it is one of the elements whose emission into the environment is being monitored and controlled. Although doses as small as one-tenth of a gram of arsenic can be fatal to humans, minute traces can actually stimulate the production of red blood cells.

Although a poison, arsenic compounds have had a history of producing useful medical products. Many skin diseases have been effectively treated with some of these compounds, as has amoebic dysentery. Newer, and potentially less dangerous treatments, have replaced many of these compounds. But perhaps the most celebrated arsenic-containing medicine is compound “606.”

Compound “606” was developed by the German scientist Paul Ehrlich in 1910 as a cure for syphilis. Before the days of antibiotics, it was one of the few known treatments for this debilitating disease. Ehrlich named his famous compound 606 because it was the six hundred and sixth compound he tried during his extensive research in trying to find a cure for syphilis. Its chemical name is arsphenamine.

Arsenic has become a material of great importance in the world of solid-state electronics. Small amounts of arsenic are now added to such semiconductors as germanium and silicon to transform them into transistors. Arsenic also forms a compound with gallium, gallium arsenide (GaAs), that can transform electricity directly into light. This is used to produce light-emitting diodes, or LEDs.

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