



# Antimony

## Description

Antimony is a semi-metallic chemical element (Z = 51) located in the group 15 of the periodic table of elements. Its name and symbol (Sb) derives from the Latin "Stibium".

Antimony is not an abundant element in nature and is barely found naturally as a metal. Antimony appears in two forms: yellow and grey. The yellow form is metastable and is composed by  $Sb_4$  molecules; the grey form is metallic and crystallizes in layers forming a rhombohedral structure. It is mainly used in metal alloys and some of its compounds, as the trioxide, are used to provide fire resistance in fabrics, also used in paints, ceramics, enamels, rubber vulcanization, and fireworks.

Antimony is mainly found naturally as  $Sb_2S_3$  (stibnite, antimonite).  $Sb_2O_3$  (valentinite) is a decomposition product of stibnite. Antimony is usually found in copper, silver and lead ores. Metal antimonides NiSb (breithauptite), NiSbS (ulmanite) and  $Ag_2Sb$  (dicrasite) are also found naturally.

Antimony is obtained by its direct reduction with iron sulphide, or by heating it to  $Sb_2O_3$  and subsequently reducing it with carbon. High purity antimony is produced afterwards by electrolytic refining.

## Properties

Physical Properties		Electronic Properties	
Name	Antimony	Valence	$\pm 3, 5$
Atomic Number	51	Electro negativity	2.05
Symbol	Sb	Covalent Radius	1.38
Atomic Weight	121.75	Ionic Radius	0.62
Density (g/ml)	6.62	Atomic Radius	1.59
Boiling Point °C	1580	Atomic Structure	$[Kr]4d^{10}5s^25p^3$
Melting Point °C	630.5	Ionization Potential (eV)	8.608

Elementary Antimony is a crystalline - fusible, breakable, silvered white coloured and with a low electrical and thermal conductivity. It evaporates down to low temperatures. This semi-metallic element resembles a metal in its appearance and physical properties, but it behaves chemically like a non metal. It can also be attacked by oxidizing acids and halogens.

It reacts violently with strong oxidants (halogens, alkali permanganates and nitrates) causing fire and explosion risks. In acid, it reacts with nascent hydrogen producing a very toxic gas (stibine). Antimony metal is neither classified as a hazardous substance by the EU legislation nor as a hazardous good for transportation.

## Uses

- Alloying agent for lead.
- Friction proof metal.
- Manufacturing of fire retardant agents.
- Electrical appliances.

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