

Argon

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Argon is a chemical element with symbol **Ar** and atomic number 18. It is in group 18 of the periodic table and is a noble gas. Argon is the third most common gas in the Earth's atmosphere, at 0.93% (9,300 ppm), making it approximately 23.8 times as abundant as the next most common atmospheric gas, carbon dioxide (390 ppm), and more than 500 times as abundant as the next most common noble gas, neon (18 ppm). Nearly all of this argon is radiogenic argon-40 derived from the decay of potassium-40 in the Earth's crust. In the universe, argon-36 is by far the most common argon isotope, being the preferred argon isotope produced by stellar nucleosynthesis in supernovas.

Argon is produced industrially by the fractional distillation of liquid air. Argon is mostly used as an inert shielding gas in welding and other high-temperature industrial processes where ordinarily non-reactive substances become reactive; for example, an argon atmosphere is used in graphite electric furnaces to prevent the graphite from burning. Argon gas also has uses in incandescent and fluorescent lighting, and other types of gas discharge tubes. Argon makes a distinctive blue-green gas laser.

Argon has approximately the same solubility in water as oxygen, and is 2.5 times more soluble in water than nitrogen. Argon is colorless, odorless, nonflammable and nontoxic as a solid, liquid, and gas. Argon is chemically inert under most conditions and forms no confirmed stable compounds at room temperature. Argon's complete octet of electrons indicates full s and p subshells. This full outer energy level makes argon very stable and extremely resistant to bonding with other elements. Before 1962, argon and the other noble gases were considered to be chemically inert and unable to form compounds; however, compounds of the heavier noble gases have since been synthesized. In August 2000, the first argon compound was formed by researchers at the University of Helsinki. By shining ultraviolet light onto frozen argon containing a small amount of hydrogen fluoride with caesium iodide, argon fluorohydride (HArF) was formed. It is stable up to 40 kelvin (−233 °C).

Argon is used in industrial processes which involve high-temperature. It has various uses such as in graphite electric furnaces to prevent the graphite from burning, metal inert gas welding for example tungsten and in the processing of titanium and other reactive elements. It is also used to grow crystals of germanium and silicon. Though it can cause headache, dizziness, dullness and suffocation if inhaled. It can cause frostbite if it comes into contact with liquid.

