

INSPIRING GASES

BOC EDUCATION

THE NOBLE GASES

THE RAREST GASES

Properties of noble gases

Helium is the second most common element in the Universe after hydrogen but it is rare on Earth. The other noble gases, neon, argon, krypton, xenon and radon account for about one per cent of the air around us. Neon, argon, krypton and xenon are obtained in industrial quantities by fractional distillation of liquefied air.

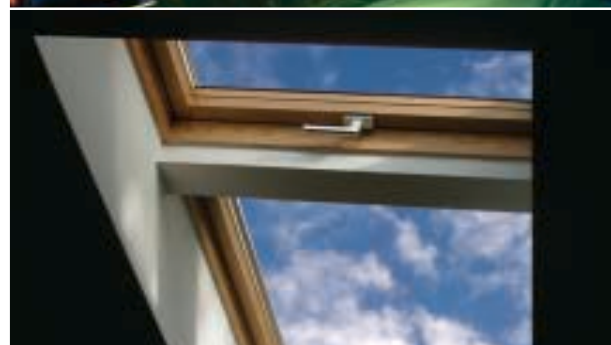
All the noble gases apart from radon were discovered or first isolated by Sir William Ramsay between 1894 and 1898. The noble gases are unreactive, colourless and odourless. They also produce light when an electric current is applied. These properties give the noble gases a wide range of uses.

	Neon	Argon	Krypton	Xenon
Parts per million in dry air	18	9340	1.1	0.1
Atomic symbol	Ne	Ar	Kr	Xe
Atomic number	10	18	36	54
Relative atomic mass	20	40	84	131
Boiling point	27K	87K	120K	165K



Neon

- ◆ Neon glows bright red when electricity is passed through it. Different coloured neon lights are produced by coating the inside of the glass tube with chemicals called phosphors.
- ◆ Neon or neon-helium gas lasers produce an intense beam of red light. They are used in the bar code readers at supermarket checkouts.



Krypton

- ◆ Krypton gas lasers are a vital tool in eye surgery. They can seal leaking blood vessels in the eye and treat damaged or detached retinas.
- ◆ High-energy fluorescent lighting tubes contain krypton or a mixture of argon and krypton.
- ◆ Krypton fills the space between the panes of glass in energy-efficient double glazing.



Argon

- ◆ Argon is the most abundant noble gas in the air. It is widely used to provide an inert atmosphere.
- ◆ In welding, argon prevents the hot metal oxidising and weakening the weld.
- ◆ Argon also stirs the molten metal during the manufacture of steel.
- ◆ In titanium production, argon is used to prevent explosions during the extraction process.



Xenon

- ◆ Xenon allows medical images to be obtained with less exposure to X-rays. It is used in Computer Aided Tomography (CAT) scanners to map a patient's blood flow.
- ◆ Xenon lasers can cut through materials that are so tough, even diamond-tipped blades will not cut them.
- ◆ Xenon is used in headlights which give off twice the light but use half the power of halogen bulbs.