

## Gases from Air: Introduction

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Air is a mixture of gases, made up of approximately 80% nitrogen and 20% oxygen. It also contains carbon dioxide, all the inert (noble) gases and water vapour. It has a density at sea level of about  $1202 \text{ g/m}^3$ . Air exerts a pressure, which is one atmosphere at sea level. In industry, air is a free raw material. Air is separated into oxygen, useful because of its reactivity, and nitrogen, useful because of its unreactivity. The inert gases are used to fill electric discharge tubes which provide us with brightly coloured advertising boards. For example, neon gives red and argon blue.



### Some background

Joseph Priestly and Karl Scheele, working separately, each discovered oxygen in the early 1770s. Daniel Rutherford discovered nitrogen in 1772. William Ramsay discovered all the inert gases in the 1890s.

Oxygen was at first produced industrially from barium oxide. Then, in the 1890s Carl Linde invented the process of liquefying air and separating the gases by fractional distillation. One of the results of this was the use of high temperature oxygen-acetylene flames for cutting and welding metals. Before Linde's process, oxygen was not available on a large enough scale to make this useful.

### Did you know?

A typical laboratory contains about 500 kg (half a tonne) of air.

Deep sea divers breathe in a mixture of oxygen and helium.

Although unreactive itself, many explosives are compounds of nitrogen.

In 1772, Antoine Lavoisier explained that burning was combining with oxygen.