

## Sodium: Introduction

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Sodium, Na, is a reactive metal with a low density ( $0.97 \text{ g/cm}^3$ ), so that it floats on water while reacting with it. It melts at  $98 \text{ }^\circ\text{C}$ , which means that the heat of its reaction with water melts the metal.

Until recently, the main use for sodium was in the manufacture of anti-knock petrol additives based on tetraethyllead(IV). Lead-based petrol additives have largely been phased out worldwide, because of the health risks of lead compounds in the air, so the market for sodium has dropped dramatically.

### Some background

The element sodium was not discovered until 1807, after the invention of electrolysis.

The Downs cell method of producing sodium (and chlorine), by the electrolysis of sodium chloride, was not perfected until 1924. The difficulty was that the sodium chloride had to be molten in order to conduct electricity but it does not melt until  $800 \text{ }^\circ\text{C}$ . At this temperature, sodium vapour ignites when exposed to air and chlorine reacts violently with many materials. The problem was solved by adding calcium chloride and barium chloride to the sodium chloride to form a mixture that melts at about  $600 \text{ }^\circ\text{C}$ .

### Did you know?

The sodium chloride must be dry because water reacts violently with molten sodium.

Plant workers wear protective clothing like that worn by racing drivers.

Sir Humphrey Davy discovered sodium and five other reactive metals.

Molten sodium metal is used to cool some types of nuclear reactors.

