Chapter 34. Groups of Elements

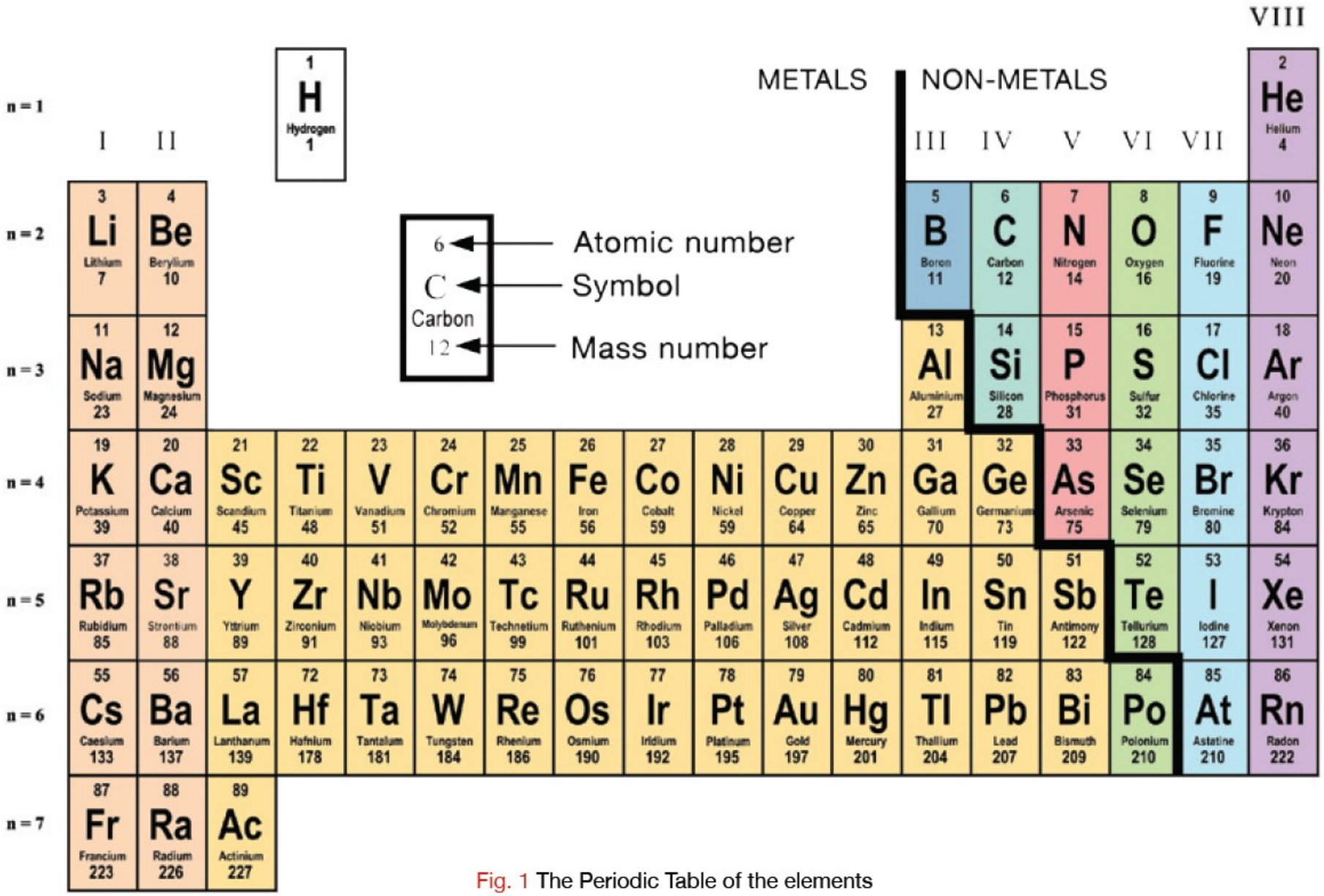


Fig. 1 The Periodic Table of the elements

The vertical columns are called **Groups**.

- Group I = The Alkali Metals
- Group II = The Alkaline Earth Metals
- Group VII = The Halogens
- Group VIII = The Noble Gases

Each element in a group have similar properties.

The horizontal rows are called **Periods**. The period gives the numbers of shells that each element has.

n = 3, means each element in that row will have 3 shells for electrons.

Group 1 – The Alkali Metals (Lithium, Sodium, Potassium)

Physical Property:

- Soft – can cut with a knife.
- Shiny silvery appearance.
- Low densities (less than 1)

Chemical Properties:

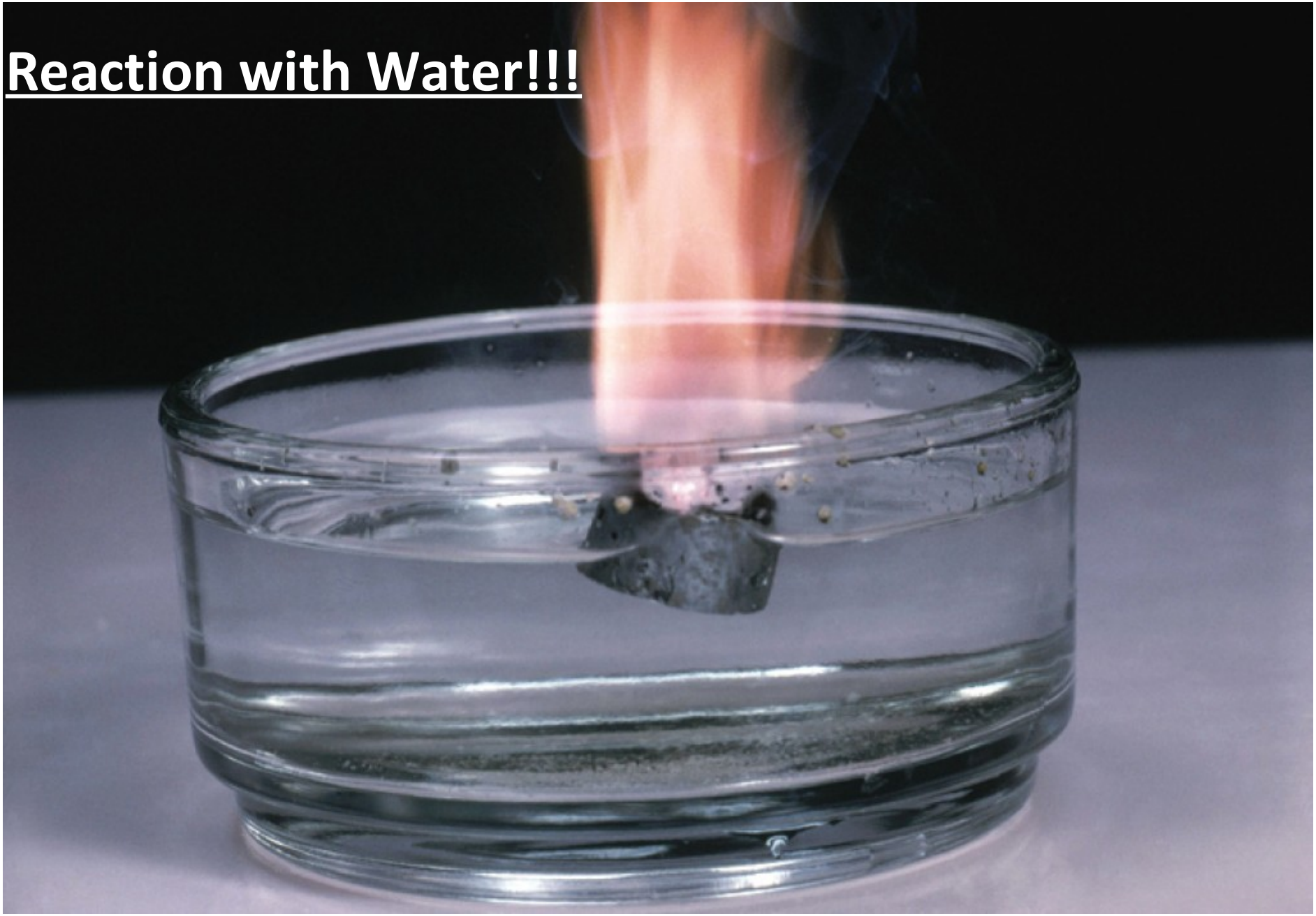
- Have to give away one electron to react.
- Very reactive
- Stored in oil (to keep away from oxygen)
- Not found free in nature.

Reaction with Oxygen:

- React slow in air to form a dull crust oxide.
- Reacts quickly when heated to form a white oxide.

e.g. Sodium + Oxygen ⟶ Sodium oxide

Reaction with Water!!!



Reaction with Water!!!

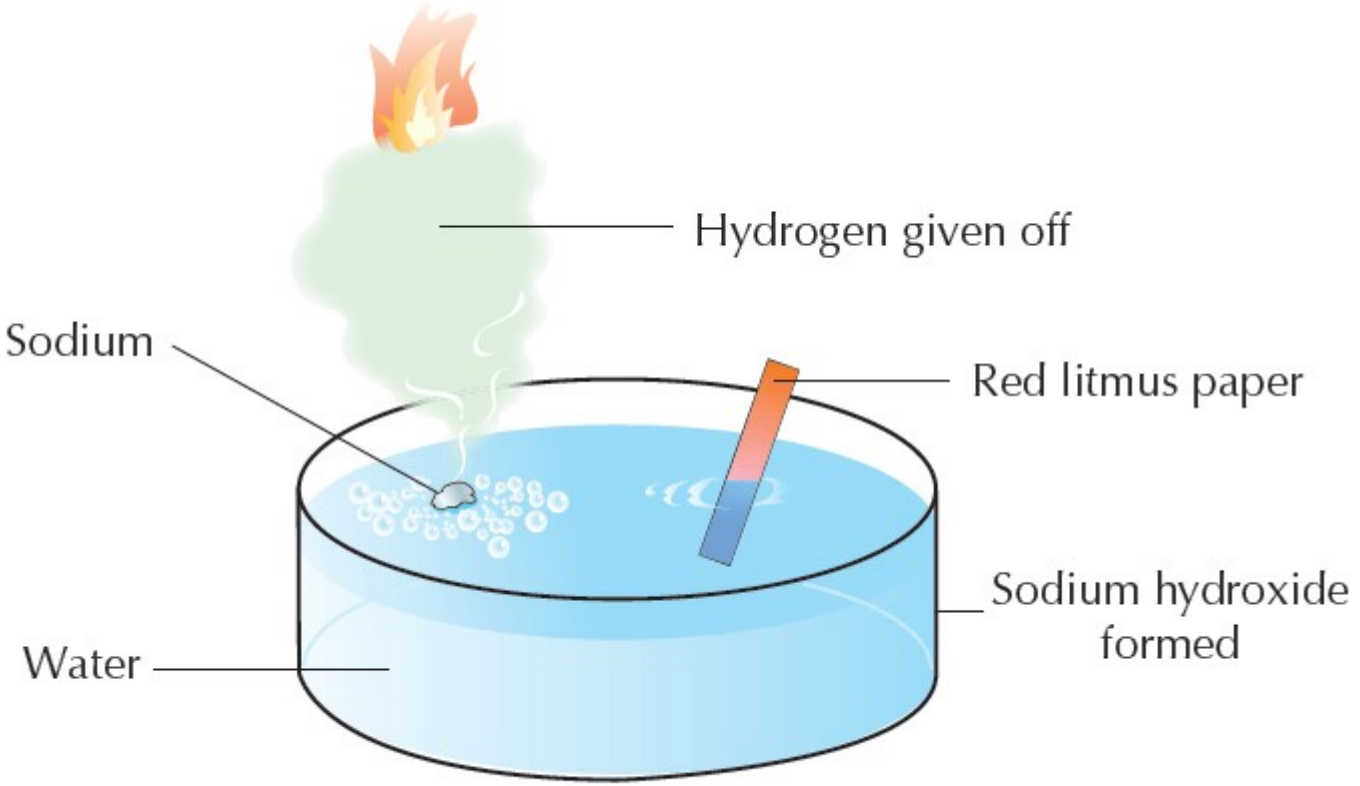


Fig. 4 Sodium reacting with water to produce sodium hydroxide and hydrogen gas.

Water reacts vigorously with water to form hydrogen gas.

e.g. Sodium + Water ⟶ Sodium Hydroxide + Hydrogen

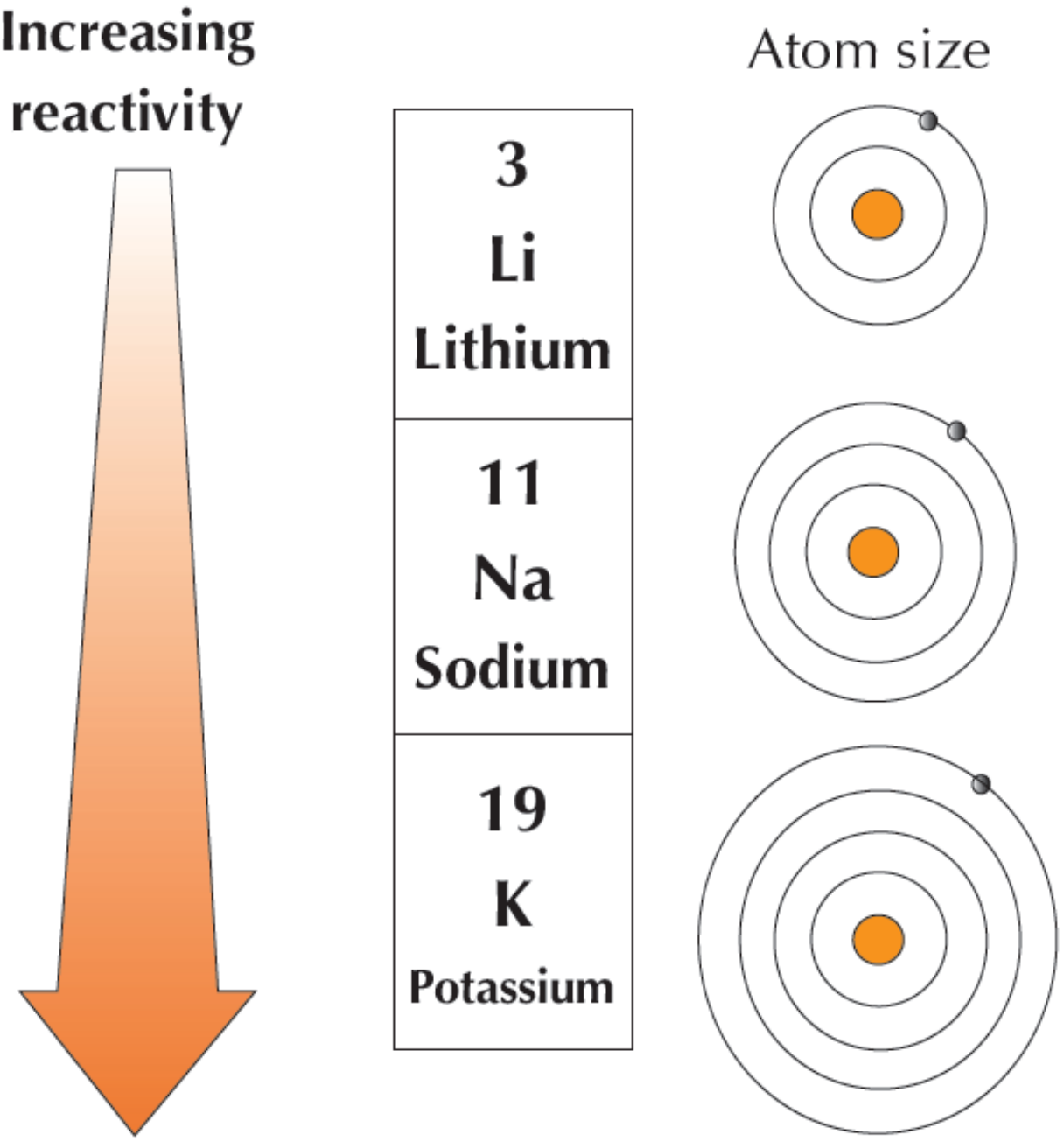


Fig. 5 Reactivity of the alkali metals increases going down the group.

Out of Lithium (Li), Sodium (Na) and Potassium (K), K is the most reactive. This is because the electron it has to lose, is on the 4^{th} shell which is far away from the nucleus.

Uses of Alkali Metals

Lithium:- is used in batteries.

Sodium:- is used in street lights.

Potassium:- is found in fertilisers