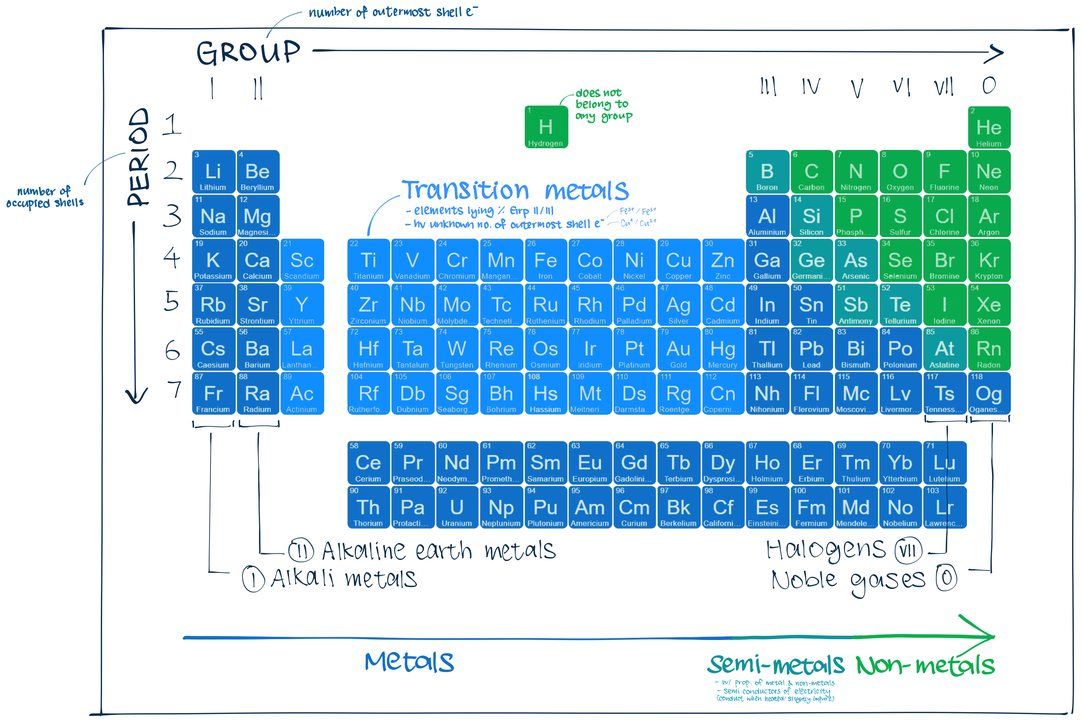
Elements

1 Arrangement - periodic table



2 Main group elements

GRP I - ALKALI METALS

- silvery solids
- soft metals (✓ cut by knife)
- low density (Li, Na, K floats on water)
- reactive
  - > $4M + O_2 \rightarrow 2M_2O$ ⇒ stored in paraffin oil
  - > $2M + 2H_2O \rightarrow 2MOH + H_2$ ⇒ gives out hydrogen ⇒ alkaline solution
- reactivity increases down the group

For more metal reactions see topic 3: Metals

GRP II - ALKALINE EARTH METALS

- silvery solids
- low density (but denser than Grp I)
- less reactive than Grp I (harder to lose outermost e^-)
  - > $M + 2H_2O \rightarrow M(OH)_2 + H_2$ ⇒ less vigorous than Grp I
    ⇒ base, insol. in water
- reactivity increases down a group

GRP VII - HALOGENS

- toxic
- → Fluorine, Chlorine, Bromine, Iodine, Astatine
  gas → liquid → solid — m.p./b.p.↑ (size↑⇒vdW↑)
  pale yellow → yellowish green → reddish brown → black — colour light → dark
- reactivity decreases down a group

GRP 0 - NOBLE GASES

- colourless gases
- very unreactive (duplet / octet electronic structure → very stable)

WHY DOES REACTIVITY DIFFER DOWN A GROUP?

- atomic size ↑
- attraction ⊻ nucleus & outermost shell e^- ↓
- easier to lose / harder to gain e^-
- reactivity increases / decreases

Grp I-III
Grp IV-VII