

PERIODIC TABLE AND ELECTRON CONFIGURATION

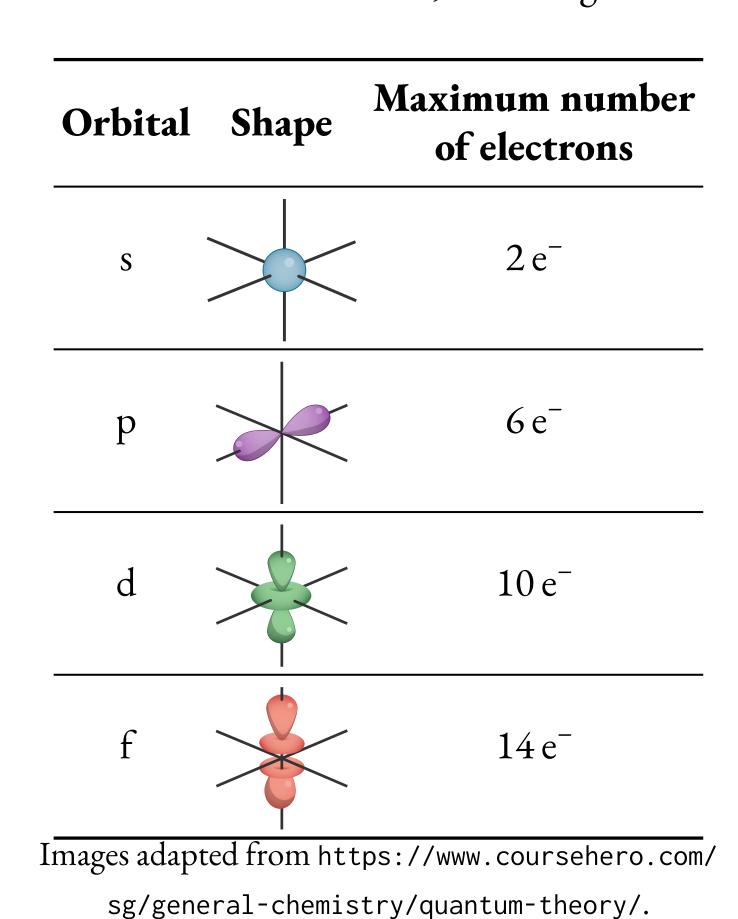
15-16 year-olds

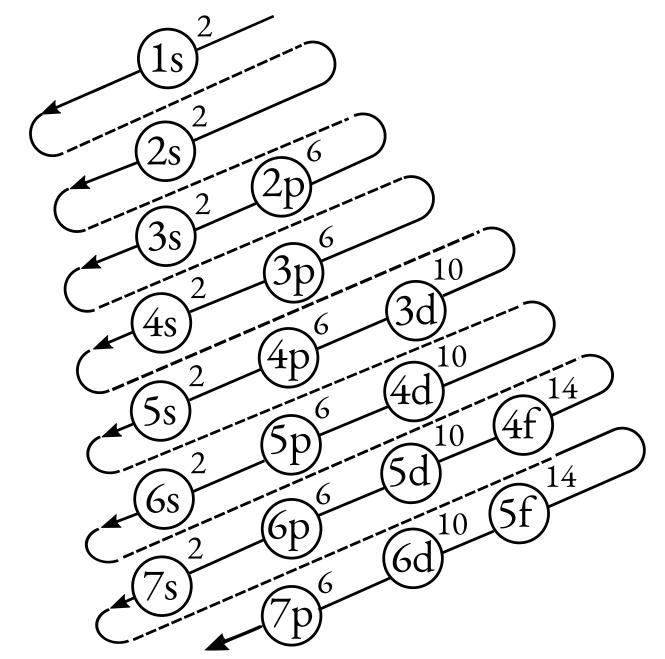




Electron Configuration

The electron configuration is the distribution of the electrons of an atom into atomic orbitals (s, p, d y f). Möller's diagram helps us to know the order in which the different orbitals should be filled, following the arrows.





Möller's diagram. Adapted from https:
//commons.wikimedia.org/wiki/File:Diagrama_de_
Configuraci%C3%B3n_electr%C3%B3nica.svg.

Ground state

State of minimum energy. Electrons follow Möller's diagram.

Excited state

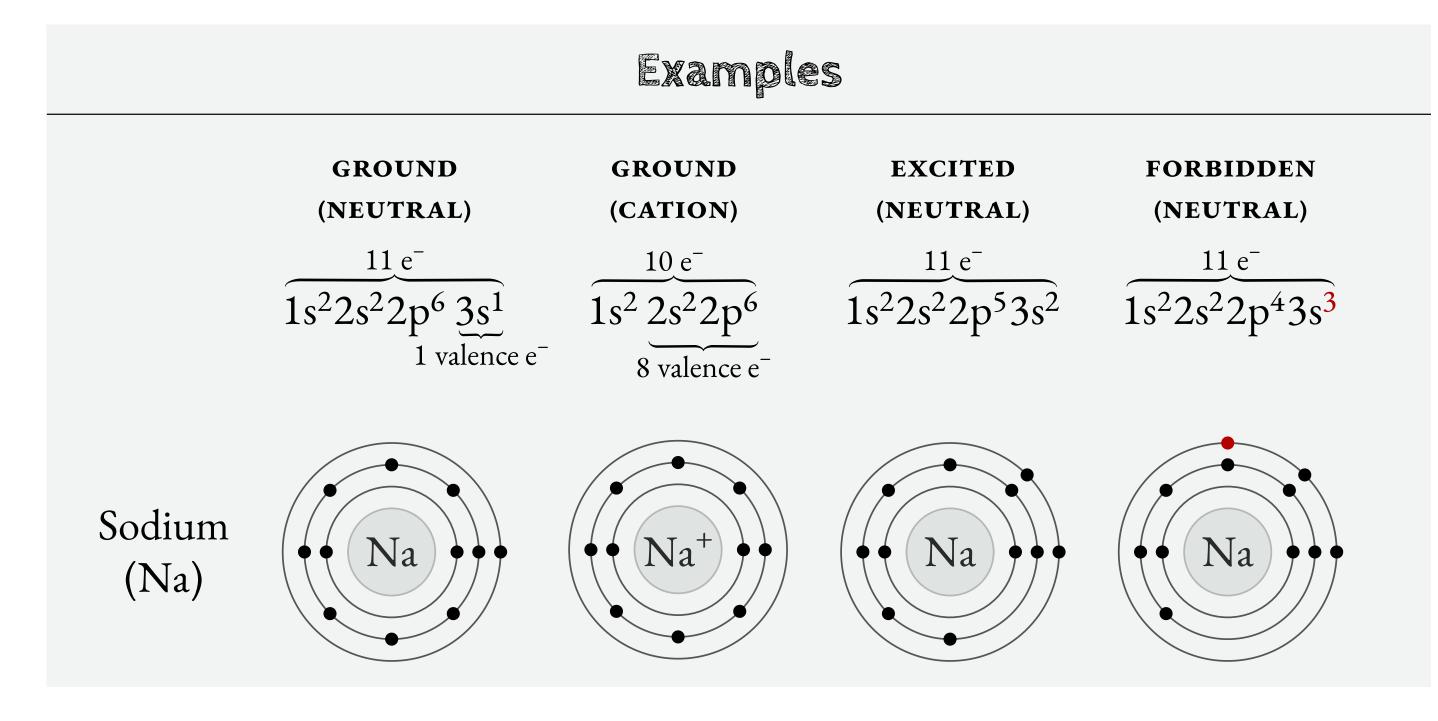
Orbitals are not filled following Möller's diagram.

Forbidden state

Any **orbital** has **more electrons** than **allowed** $\left(\frac{s \ p \ d \ f}{2 \ 6 \ 10 \ 14}\right)$

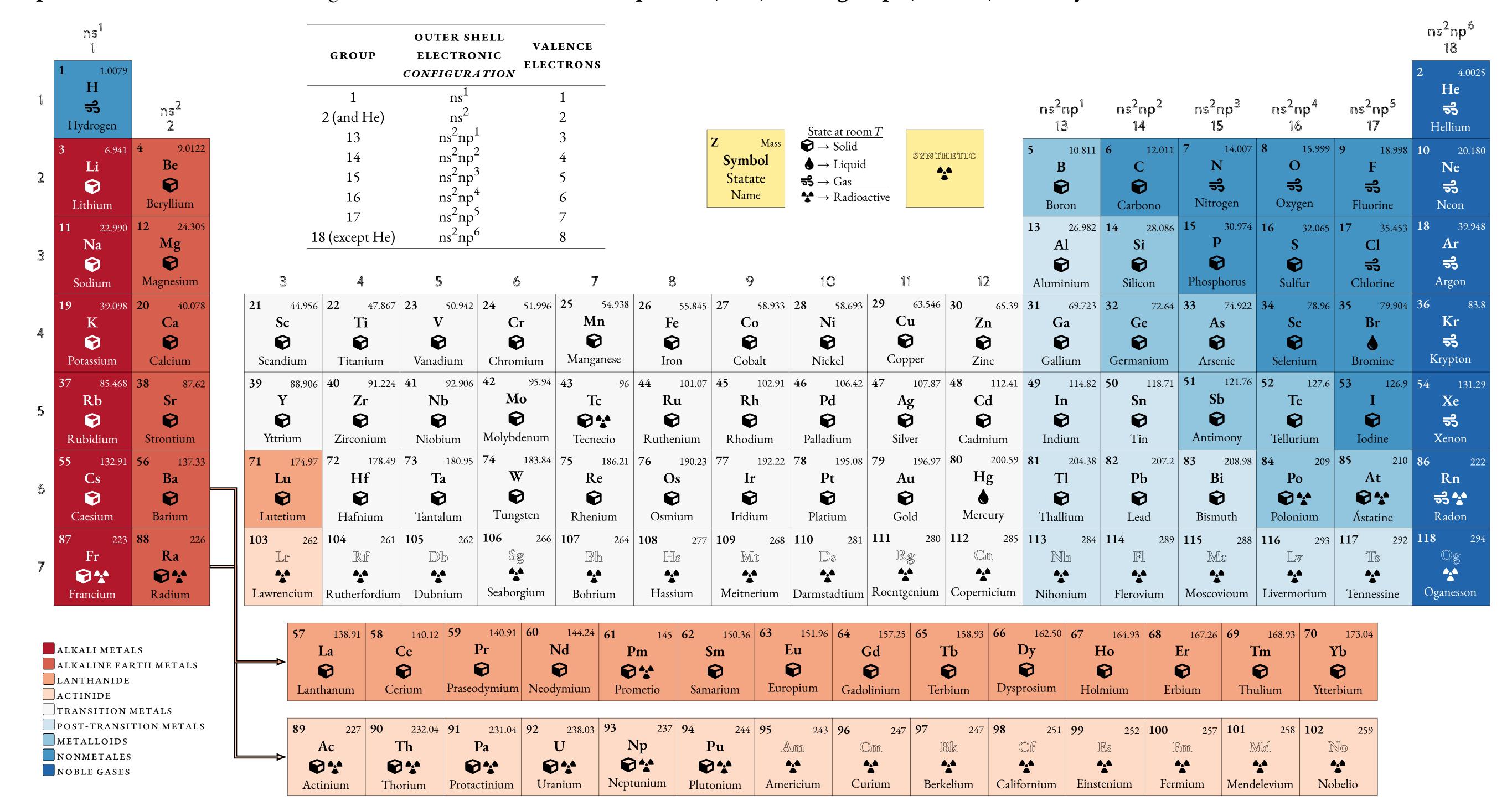
Valence Electrons

Valence electrons are those of the outer shell of an atom, being responsible for the interactions between atoms and the formation of chemical bonds.



Periodic Table of Elements

The periodic table of elements arrange the 118 elements known into 7 periods (rows) and 18 groups (columns), order by its atomic number Z.



Classification of Chemical Elements

Chemical elements can be classified into metals, metalloids, nonmetals and noble gases, according to their physical and chemical properties:

Metals

Shiny appearance, they are **good conductors** of **heat** and **electricity** and they can make **alloys** with other metals. Most of them are **solids** at room T. (**Hg** is \diamond).

Ion formation They tend to lose electrons, forming cations (\bullet charged ions). Examples: Li \longrightarrow Li⁺ + 1 e⁻; Mg \longrightarrow Mg²⁺ + 2 e⁻; Al \longrightarrow Al³⁺ + 3 e⁻.

Metalloids

Breakable solids with a metallic aspect that are semiconductors and behave like nonmetals.

Nonmetals

Dull appearance, they are bad conductors of heat and electricity and they can be breakable. They can be solids, liquids or gases at room temperature.

Ion formation They tend to gain electrons, forming anions (\bigcirc charged ions). Examples: Cl + 1 e⁻ \longrightarrow Cl⁻; O + 2 e⁻ \longrightarrow O²⁻; P + 3 e⁻ \longrightarrow P³⁻.



He, Ne, Ar, Kr, Xe and 🚱 Rn. Odourless and colorless monoatomic gases which barely react chemically, since they have eight electrons in their outer shell.