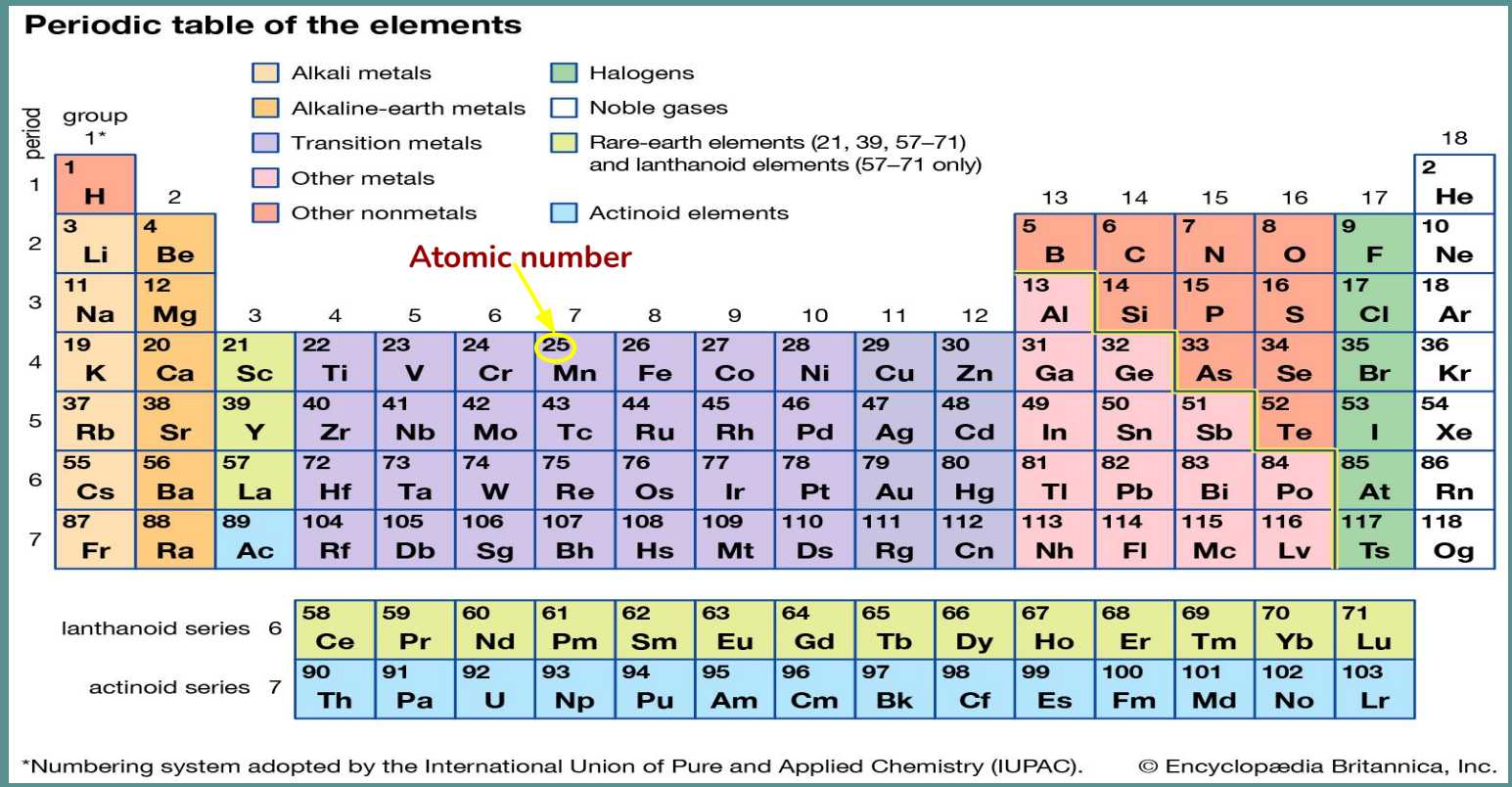
Lesson 4

Chemistry 0

Fall 2021, L. Tracey Gao

The Periodic Table



Key Concepts

- An element is a substance made up of only one type of atom.
- The atomic number of an atom is equal to the number of protons in its nucleus.
- The number of electrons surrounding the nucleus of an atom is equal to the number of protons in its nucleus.

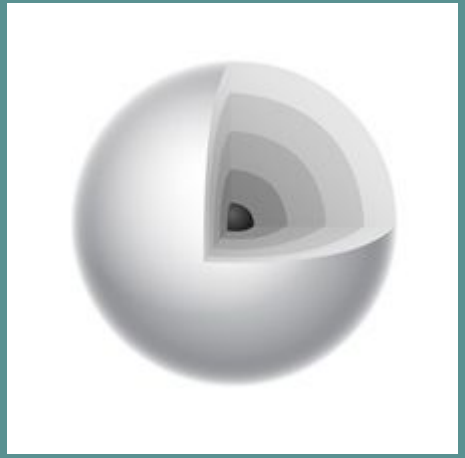
Key Concepts

- Different atoms of the same element can have a different number of neutrons.
- Atoms of the same element with different numbers of neutrons are called “isotopes” of that element.
- The atomic weight (average atomic mass) of an element is the average mass of the different isotopes of the element.
- The atoms in the periodic table are arranged to show characteristics and relationships between atoms and groups of atoms.

Key Concepts

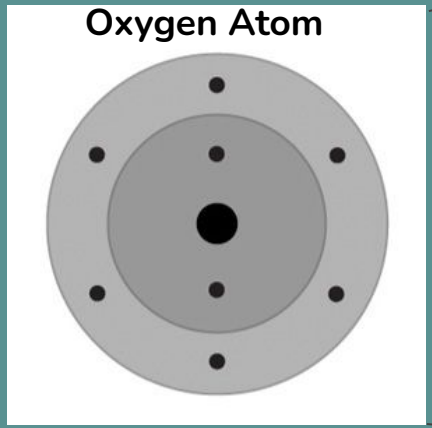
- The **periodic table** is a chart containing information about the atoms that make up all matter.
- The elements are numbered according to their **atomic number**.
- The elements are organized by their **electron** structure.

Energy Levels



1. The electrons surrounding an atom are located in regions around the nucleus called **“energy levels”**.
2. An energy level represents the 3-dimensional space surrounding the nucleus where electrons are most likely to be.
3. The first energy level is closest to the nucleus. The second energy level is a little farther away than the first. The third is a little farther away than the second, and so on.
4. Each energy level can accommodate or “hold” a different number of electrons before additional electrons begin to go into the next level.

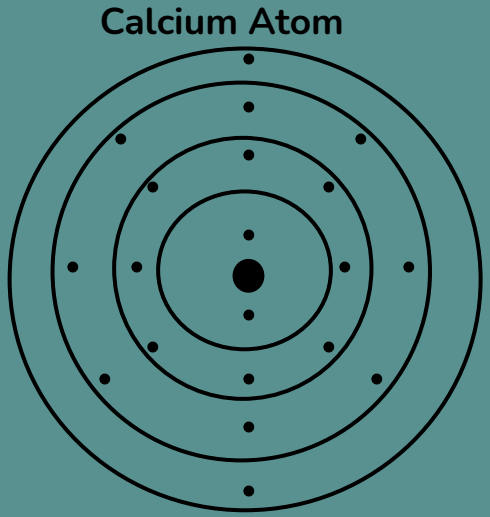
The Arrangement of Electrons on Energy Levels



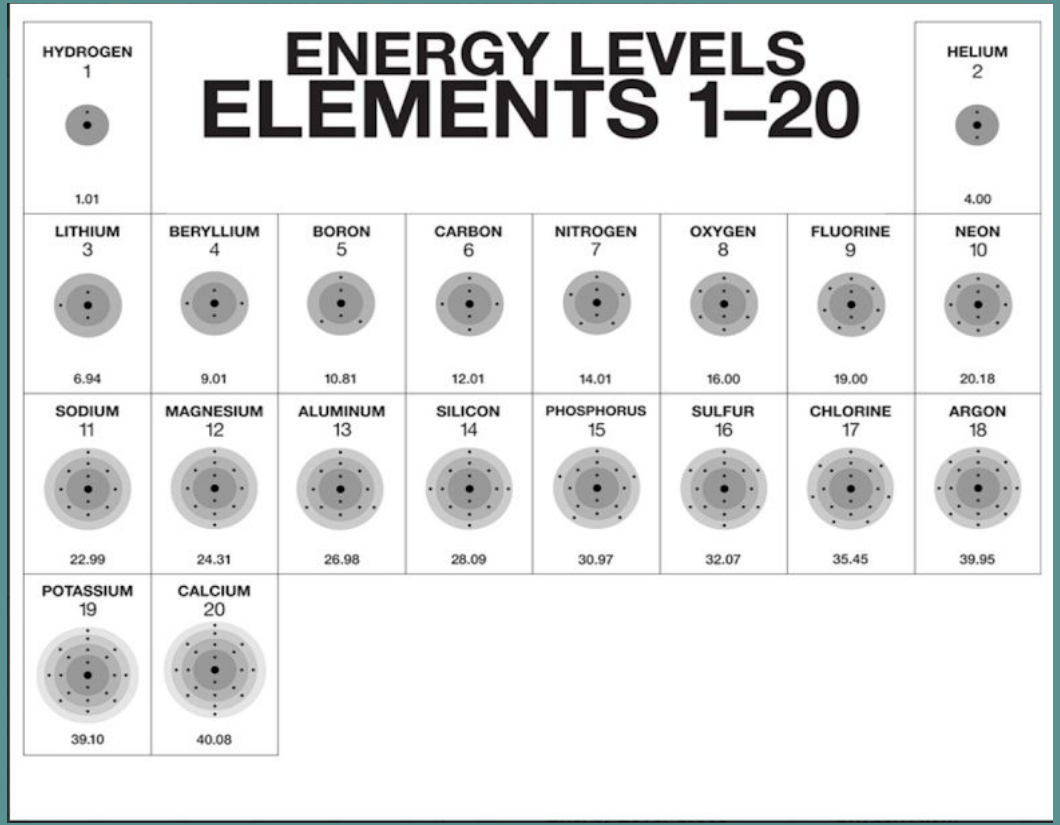
1. When the first energy level has 2 electrons, the next electrons go into the second energy level until the second level has 8 electrons.
2. When the second energy level has 8 electrons, the next electrons go into the third energy level until the third level has 8 electrons.
3. When the third energy level has 8 electrons, the next electrons go into the fourth energy level.

Energy Levels for Element 1-20

1. When the first energy level has 2 electrons, the next electrons go into the second energy level until the second level has 8 electrons.
2. When the second energy level has 8 electrons, the next electrons go into the third energy level until the third level has 8 electrons.
3. When the third energy level has 8 electrons, the next electrons go into the fourth energy level.

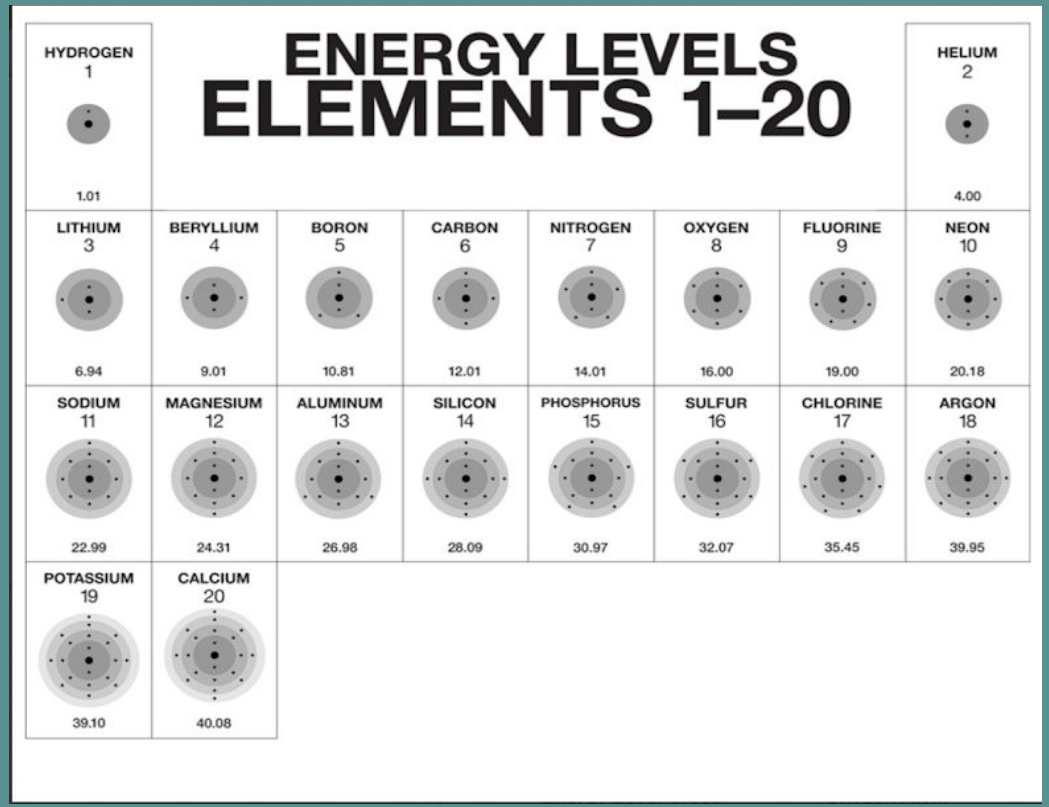


Energy Levels for Element 1-20



1. Electron structure is the chief factor in determining chemical behavior of an element.
2. Specifically, it is the number of **valence electrons** that is most important.
3. Valence electrons are the electrons in the outer shell.

Energy Levels for Element 1-20



Why are **valence electrons** so important?

Because atoms tend to gain, lose or share their valence electrons.