



Lesson 3: Atomic Theory

- An atom contains protons (positive charge) , neutrons (no electrical charge), and electrons (negative charge)
- The nucleus contains nucleons; protons and neutrons, which are about 99.9% of the mass
- The atomic number is the number of protons in the nucleus, Helium has 2 Gold has 79; Magnesium has 12
- Electrons surround the nucleus. Each electron is in a specific energy level

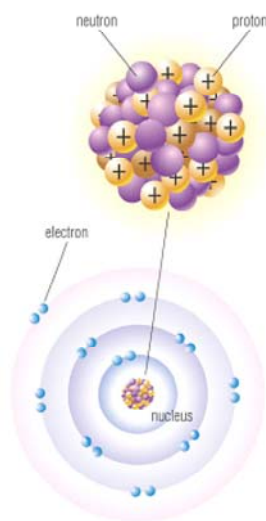


FIGURE A2.7 Electrons occupy most of the volume of an atom. Most of the mass is in the nucleus. A calcium atom (shown here) has 20 electrons, 20 protons, and 20 neutrons.

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Energy Levels/Shells/Rings/Orbitals

- Region around the nucleus that either has an electron or is empty
- Like spheres being added around the nucleus
- First level can hold 2 electrons (K-shell)
- Second level has 8 electrons (L-shell)
- Third level has 8 electrons (M-shell)
- We will learn up to 20, after that the pattern gets complicated.
- An energy level can be empty, partly filled, or completely filled.
- Partly filled levels can overlap with another atom, this will make a molecule
- electrons in the outer shell are called valence electrons

	1									18
1	1									2
2	3	4	5	6	7	8	9	10		
3	11	12	13	14	15	16	17	18		

FIGURE A2.12 Part of the periodic table showing electron arrangements for the atoms of each element

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Formation of ions

- Gain or lose outer most electrons, ionization
- Ion = electrically charged atom (or group)
- Cation = positively charged ion, form when a metal loses electrons

Example: Magnesium atom

cats have POS.

- Anion – negatively charged ion, form when non-metal gains electrons

Example: Oxygen

Why do atoms gain or lose electrons?

- They want to have the same number of electrons as the nearest noble gas
- More stable = less reactive

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