

Example: Na: $1s^2 2s^2 2p^6 3s^1$ 1 valence electron
 Na^+ $1s^2 2s^2 2p^6$ resembles Neon with 8 valence electrons

Electron dot diagrams for cations:

Example: Ca: $\rightarrow Ca^{2+}$

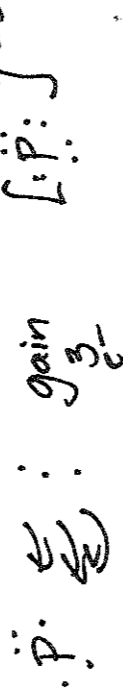
no dots in dot diagram

Forming Anions:

- Non-metals gain electrons to achieve Noble gas configurations
 - They make negative ions (more negative e^- than positive protons)
- Example: S = $1s^2 2s^2 2p^4$ 6 valence e.
 $1s^2 2s^2 2p^6$ 8 valence e.

Electron dot diagrams for anions:

Example: Phosphide ion



Section 7.2- Ionic Bonds and Ionic Compounds

Ionic Bonding:

- Formed when an electron or electrons are transferred from metals to non-metals producing oppositely charged ions (cations and anions) that are electrically attracted to each other.
- The difference in electronegativity (ΔEN) is generally larger than 1.7
- Example: $NaCl \Delta EN \rightarrow 3.0 - 0.9 = 2.1$ The difference is greater than 1.7 so an electron is transferred
- Ionic compounds are also called salts
- Simplest ratio of elements in an ionic compound is called a formula unit
- Atoms are trying to achieve noble gas configuration

Example:



Example #2:

Rule 1: All atoms must reach noble gas configuration

Rule 2: All electrons must be accounted for



 = formula unit, which shows the and

 in the smallest representative particle of the substance.

Properties of Ionic Compounds

1. Most ionic compounds are crystalline solids at room temperature.
2. Ionic compounds generally have high melting and boiling points.
3. Under pressure ionic crystals will break or cleave.
4. Ionic compounds can conduct and electric current (are conductors) in their molten (liquid) state and also in their aqueous (when dissolved in water) state.

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Date: _____

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Outcome: Determine the number of valence electrons in an atom of a representative element

• The electrons in the outermost energy level are responsible for the chemical and physical properties of each atom

• These are called the valence electrons the s and p electrons in the outer energy level (for representative elements)

• Inner electrons are called core electrons

Keeping Track of Electrons

Atoms in the same group (column) have...

1. the same electron configuration end
2. the same number of valence electrons

Group number (Ia, VIa) = # of valence electrons

Example: Be, Mg, Ca have 2 valence electrons

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
H	He															He		
Li	Be	B	C	N	O	F	Ne											Ne
Na	Mg	Al	Si	P	S	Cl	Ar											Ar
K	Ca															Kr		
Rb	Sr															Xe		
Cs	Ba															Rn		
Fr	Ra																	

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

Electron Dot Diagrams

• Also called Lewis dot diagram

• way of showing valence electrons

How to write them:

1. Write the symbol to represent the nucleus and the core electrons
2. Start drawing electrons (remember Hunds rule-they don't pair up until they have to)
3. Max 8 electrons

Example: Nitrogen



The Octet Rule

Outcome: Explain how the octet rule applies to atoms of metallic and non metallic elements. In forming compounds, atoms tend to achieve noble gas config.; # electrons in the outer level is 8.

Outcome: Describe how cations form, describe how anions form.

Forming Cations:

- metals lose their valence electrons to achieve Noble Gas configuration
- This makes them cations (more positive protons than negative electrons)