

CST:Chem: 2a, 2c, 7b
1&E: 1LChemCatalyst:

Q: Only certain combinations of elements result in the formation of compounds. Explain.

* What determines the proportion in which elements combine to form ionic bonds?

Notes:

- What are some characteristics of ionic compounds?
 - metal atom loses valence electrons to become (+)
 - nonmetal atom gains electrons to become (-)
 - the attraction between the (+) & (-) ions hold it together
 - they form a crystal lattice structure to balance the repulsion & attraction b/w ions
- How do I figure out the compound formula for an ionic compound?
 - * MUST look @ the oxidation number (charge) of the metal & nonmetal atoms
 - the overall charge of the compound MUST BE ZERO
 - criss-cross cancel charges
 - ex: $\text{Mg}^{+2} \text{Cl}^{-1} = \text{MgCl}_2$
* 1's are invisible
 - ex: $\text{Li}^{+1} \text{O}^{-2} = \text{Li}_2\text{O}$
 - ex: $\text{Mg}^{+2} \text{O}^{-2} = \text{MgO}$
* if they are the same #, they already cancel, so get rid of them
 - * # of electrons lost must equal the # of electrons gained
 - always write the cation 1st (metal atom 1st)

Getting Connected Activity

Complete the following table:

Element 1 (metal)	# of valence electrons	Charge of Element 1	Element 2 (nonmetal)	# of valence electrons	Charge of Element 2	Compound & Name
Na	1	Na ⁺¹	F	7	F ⁻¹	NaF Sodium flouride
Mg			O			
Mg			Cl			
Be			F			
						MgS Magnesium sulfide
						CaCl ₂ Calcium chloride
Na			Br			
K			Se			Potassium selenide
Al			N			
Al			O			Aluminum oxide
Al			F			
Ca			O			
Na			OH			Sodium hydroxide
Al			(NO ₃)			

Making Sense Notes:

• What are polyatomic ions?

- ions that are made up of more than one atom
 - a group of atoms with a charge
- ex: NO_3^{-1} , SO_4^{-2} , PO_4^{-3}
- When working with them in ionic compounds formulas, cross cancel charges just like a single anion
 - * HOWEVER, never change the subscript in the polyatomic ion
 - Use parentheses around the polyatomic ion in the formula
 - ex: $\text{Na}^{+1} (\text{PO}_4)^{-3}_3 = \text{Na}_3 \text{PO}_4$
 - $\text{Mg}^{+2} (\text{PO}_4)^{-3}_2 = \text{Mg}_3 (\text{PO}_4)_2$

• How do I name ionic compounds?

- Name the cation first, then the anion.
- Cations use the element name.
- Anions use the element name with the -ide ending
- Transition metals have varying oxidation #s, so you must uncross-cross the formula to get their charge. Then put the charge in Roman numerals in parentheses behind the name.
- If the compound has a polyatomic ion, simply use its name.
 - ex: NaBr = Sodium bromide
 - CaCl_2 = calcium chloride
 - transition metal $\leftarrow \text{Cu}(\text{NO}_3)_2 = \text{Cu}^{+2} (\text{NO}_3)^{-1}_2 = \text{Copper (II) nitrate}$

• What about energy during a chemical rxn?

- during a chemical rxn, energy is either absorbed (endothermic) or released (exothermic)