Writing Formulas and Names of Ionic Compounds

An **ionic compound** is a compound composed of ions. They tend to be combinations of metals and nonmetals.

$CuSO_4$

Formulas of Ionic Compounds:

- Formulas for ionic compounds can be written by the following steps:
- **(1)** Write the formula for the cation and anion (Don't forget to include the charge of each ion).
- **(2)** Decide how many cations and anions are needed so that the sum of their charges balances out to be zero or use the **criss – cross method**.
- **(3)** Write the formula of the compound by writing the number of cations followed by the number of anions which you used in step #2. **Remember not to include the charges of the ions since now they balance out to be neutral.**
  - (*Note when using more than one polyatomic ion the polyatomic ion must be written in parentheses).

Write the formula for barium chloride

Ba^{2+} Cl^{-}

$BaCl_2$

Write the formula for iron (II) oxide

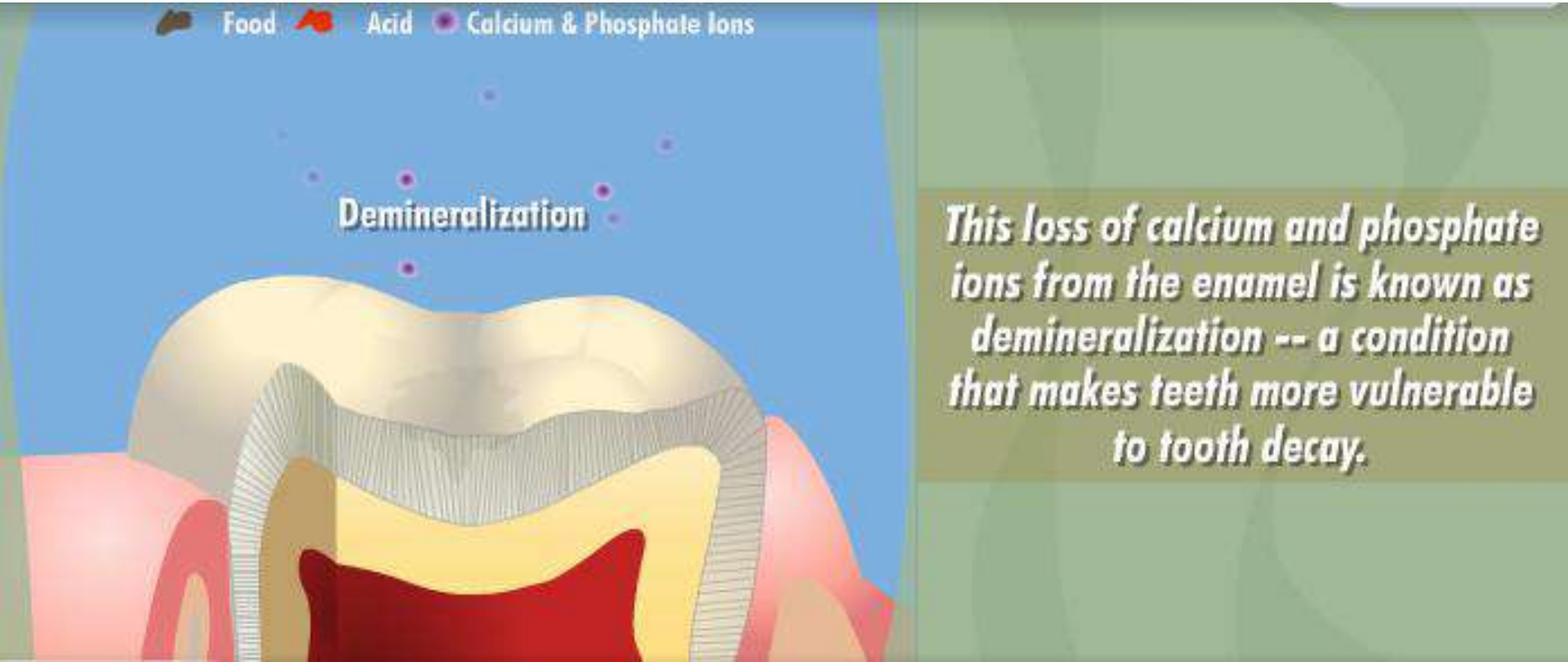
Fe^{2+} O^{2-}

FeO

Write the formula for calcium phosphate

Ca^{2+} PO_4^{3-}

$Ca_3(PO_4)_2$



NH_4^+ CO_3^{2-}

Write the formula for ammonium carbonate

$$(NH_4)_2CO_3$$

Write the formulas for the following compounds

(a) cobalt (II) chloride

(b) lithium sulfate

(c) ammonium dichromate

(d) aluminum oxide

(e) boron (III) phosphide

(f) Chromium (V) nitrate

Write the formulas for the following compounds

(a) cobalt (II) chloride $CoCl_2$

(b) lithium sulfate Li_2SO_4

(c) ammonium dichromate $(NH_4)_2Cr_2O_7$

(d) aluminum oxide Al_2O_3

(e) boron (III) phosphide BP

(f) Chromium (V) nitrate $Cr(NO_3)_5$

Naming Ionic Compounds

Naming Ionic Compounds

- When naming ionic compounds the following steps are followed:

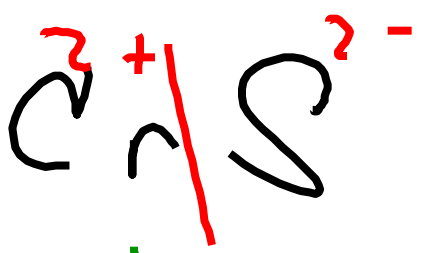
(1)Separate the compound into its positive and negative parts.

  - (Note that the positive part of a compound will be normally be only the first element with the exception of ammonium which is NH_4^+)

(2) Write the name of the cation followed by the name of the anion.

Teacher Examples

- $Cr_3(PO_4)_4$ chromium(IV) phosphate



chromium(III) sulfide

- $Cr(CN)_2$ chromium(III) cyanide

- $Mg(CN)_2$ magnesium cyanide

Write the name of ZnO

Zinc Oxide

- Zinc oxide is added to many breakfast cereals, as a source of zinc; a necessary nutrient.
- Because it absorbs both UVA and UVB rays of ultraviolet light, zinc oxide can be used in ointments, creams, and lotions to protect against sunburn and other damage to the skin caused by ultraviolet light.

Write the name of CuO

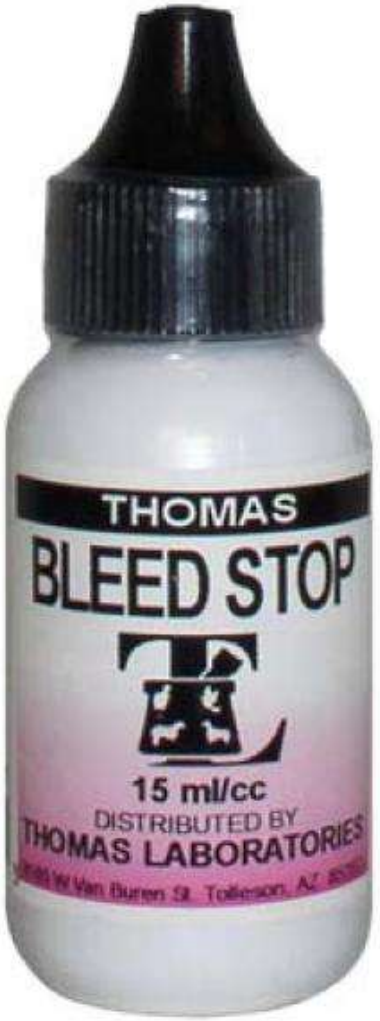
Copper (II) Oxide

- Copper (II) oxide can be used in batteries.
- Copper (II) oxide is used as a pigment in ceramics to produce blue, red, and green (and sometimes gray, pink, or black) glazes.

Write the name of $Fe_2(SO_4)_3$

Iron (III) Sulfate

- Medically it is used as an **astringent** (shrinks mucous membranes) and **styptic** (contracts blood vessels to stop bleeding).



Write the name of $Mn^{2+}CO_3^{2-}$

manganese(II) carbonate

Manganese (II) Carbonate

- Manganese (II) carbonate is widely used as an additive to plant fertilizers to cure manganese deficient crops.
- It is also used in health foods (Manganese is an essential dietary mineral in very small quantities. A deficiency in manganese can cause skeletal deformations and inhibits the healing of wound healing.)

Write the name of Ag_2S

Silver sulfide

Silver Sulfide

- **Silver sulfide is the tarnish that forms on silver when exposed to the atmosphere.**

Name the following compounds

(a) $SrCl_2$

(b) $Cr(OH)_2$

(c) $KClO_4$

(d) NH_4MnO_4

(e) NiP

Name the following compounds

(a) $SrCl_2$ **strontium chloride**

(b) $Cr(OH)_2$ **chromium(II) hydroxide**

(c) $KClO_4$ **potassium perchlorate**

(d) NH_4MnO_4 **ammonium permanganate**

(e) NiP **nickel(III) phosphide**

Homework

- **Worksheet: Naming Ionic Compounds**
- **Worksheet: Formulas of Ionic Compounds**
- **Study your Polyatomic Ions**