

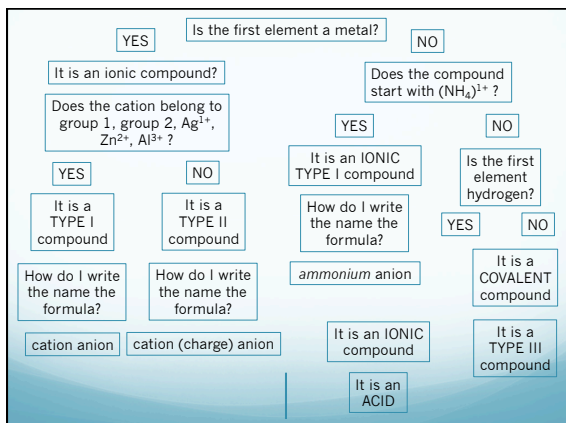
Nomenclature

Formula Writing

- Rules for Writing Formulas:
- Each atom present is represented by its element symbol (Na, Mg, P, Br)
- The number of each type of atom is indicated by a subscript written to the right of the element symbol. (H_2O ; not H_2O or 2HO)
- When only one atom of a given type is present, the subscript 1 is not written (H_2O ; not H_2O_1)

Formula Writing

- Tips for writing formulas (ex. calcium chloride)
- Write down the elements/ions: Ca Cl
- Write down the cation's charge and the anion's charge: Ca^{2+} $(\text{Cl})^{1-}$
- Find the least common multiple: 2 & 1 \rightarrow 2
- Balance the charges: Ca^{2+}_1 $(\text{Cl})^{1-}_2$
- Write the formula without the charges: CaCl_2



Nomenclature: Type I (Pg 2)

Type I Compounds:

- These compounds are made up of a metal and nonmetal(s).
- They are ionic compounds
- The metal present forms only one oxidation state of cation:
 - Type I cations: Group 1, Group 2, Ag^{1+} , Zn^{2+} , Al^{3+} , NH_4^{1+}
- Name them as you see them
 - Binary: cation + anion + -ide
 - Polyatomic: cation + polyatomic ion
 - *Ammonium binary: ammonium + anion + -ide
 - *Ammonium polyatomic: ammonium + polyatomic ion

Nomenclature: Type II (Pg2)

Type II Compounds:

- These compounds are made up of a metal and nonmetal(s).
- They are ionic compounds
- The metal present forms two or more oxidation states of cation:
 - All other metals besides: Group 1, Group 2, Ag^{1+} , Zn^{2+} , Al^{3+} , NH_4^{1+}
- Name them as you see them (with cation charge[⊙])
 - Binary: cation (charge) + anion + -ide
 - Polyatomic: cation (charge) + polyatomic ion

Nomenclature: Type II (Pg2)

Steps for Naming Type II Compounds:

- Determine the anion charge
- Determine the overall negative charge
- Determine the overall positive charge
- Determine the cation charge
- Name them as you see them (with cation charge☺)
 - Binary: cation (*charge*) + anion + -ide
 - Polyatomic: cation (*charge*) + polyatomic ion

Nomenclature: Anions

Anions always appear after cations in the formula:

Monatomic ions:

- Halogens (1- charge)
- Oxygen group (2- charge)
- Nitrogen group (3- charge)
- *Hydrogen (1- charge)

Polyatomic ions

- *When it does not appear at the beginning of the compound.

Old Names

- | | |
|---------------------------------------|--|
| • Fe ²⁺ : <i>Ferrous</i> | • Sn ⁴⁺ : <i>Stannic</i> |
| • Fe ³⁺ : <i>Ferric</i> | • Sb ³⁺ : <i>Stibous</i> |
| • Co ²⁺ : <i>Cobaltous</i> | • Sb ⁵⁺ : <i>Stibic</i> |
| • Co ³⁺ : <i>Cobaltic</i> | • Au ¹⁺ : <i>Aurous</i> |
| • Ni ²⁺ : <i>Nickelous</i> | • Au ³⁺ : <i>Auric</i> |
| • Ni ³⁺ : <i>Nickelic</i> | • Hg ₂ ²⁺ : <i>Mercurous</i> |
| • Cu ¹⁺ : <i>Cuprous</i> | • Hg ²⁺ : <i>Mercuric</i> |
| • Cu ²⁺ : <i>Cupric</i> | • Pb ²⁺ : <i>Plumbous</i> |
| • Sn ²⁺ : <i>Stannous</i> | • Pb ⁴⁺ : <i>Plumbic</i> |

Nomenclature: Type III(Pg2)

Type III Compounds:

- These compounds are made up of nonmetals and/or metalloids.
- They are covalent compounds
- Name them as you see them (with greek prefixes)
 - Binary: *(prefix)* first + *(prefix)* second + -ide
 - *mono is never used for the first element.
 - If the second element is oxygen, the *o-* or *a-* of the prefix is dropped

Type III: Greek Prefixes

1 : Mono-	6 : Hexa-
2 : Di-	7 : Hepta-
3 : Tri-	8 : Octa-
4 : Tetra-	9 : Nona-
5 : Penta-	10: Deca-

Note: H₂O is water & NH₃ is ammonia

Nomenclature: Acids (Pg2)

- Definition: A substance that produces H⁺ ions in solution.
- H⁺ is the cation part of the compound.
- Refer to Page 15

Types Of Acids

Hydracid
(non-oxyacid)
Example: HCl

- Does not contain oxygen
 - Made up of Hydrogen (cation) and monoatomic ion (anion) or polyatomic ion which does not contain oxygen
- Example: HCl
H⁺ is the cation
Cl⁻ is the anion

-The acid is named with a prefix *hydro* and the suffix *-ic*

- Example above: *hydrochloric acid*

Oxyacid
Example: HNO₃

- contain oxygen
- Made up of Hydrogen (cation) and polyatomic ion (anion) which contains oxygen

Example: HNO₃
H⁺ is the cation
(NO₃)⁻ is the anion

-If the anion suffix is *-ate*, acid suffix is *-ic*
-If the anion suffix is *-ite*, acid suffix is *-ous*

- Example above: *nitric acid*

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Rules for Naming Acids

Hydracids
(non-oxyacids)

- - The acid is named with a prefix *hydro* and the suffix *-ic*

Compound	ions present	anion name	Acid name
HCl	H ⁺ and Cl ⁻	<i>chloride</i>	Hydrochloric acid
HCN	H ⁺ and CN ⁻	<i>cyanide</i>	Hydrocyanic acid
H ₂ S	H ⁺ and S ²⁻	<i>sulfide</i>	Hydrosulfuric acid

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Rules for Naming Acids

Oxyacids

- - The acid name is formed from the root name of the anion with a suffix of *-ic* or *-ous*
- If the anion suffix is *-ate*, acid suffix is *-ic*
- If the anion suffix is *-ite*, acid suffix is *-ous*

Compound	ions present	anion name	Acid name
HNO ₃	H ⁺ and NO ₃ ⁻	<i>nitrate</i>	nitric acid
HNO ₂	H ⁺ and NO ₂ ⁻	<i>nitrite</i>	nitrous acid

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Oxyacids

- If the anion suffix is *-ate*, acid suffix is *-ic*
- If the anion suffix is *-ite*, acid suffix is *-ous*

Compound	ions present	anion name	Acid name
H ₂ SO ₃	H ⁺ and (SO ₃) ²⁻	sulfite	sulfurous acid
H ₂ SO ₄	H ⁺ and (SO ₄) ²⁻	sulfate	sulfuric acid
H ₃ PO ₄	H ⁺ and (PO ₄) ³⁻	Phosphate	Phosphoric acid
H ₃ PO ₃	H ⁺ and (PO ₃) ³⁻	Phosphite	Phosphorous acid

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