

Naming Compounds



Day 2

Working backwards: name to formula

- It's possible to determine a formula from a name
- E.g. What is the formula of sodium oxide?
To get the answer, first write the valences:
 $\text{Na}^1\text{O}^2 \rightarrow \text{Na}_2\text{O}$
- What is the formula of copper(II) oxide?
 $\text{Cu}^2\text{O}^2 \rightarrow \text{Cu}_2\text{O}_2 \rightarrow \text{CuO}$
- For covalent compounds, simply use the prefixes to tell you the number of each element:
- What is the formula for dinitrogen trioxide?
 N_2O_3
- Give formulae for: lithium sulfide, dinitrogen monoxide, lead(IV) sulfate

Assignment

1. Name each according to IUPAC rules:
a) ZnS, b) FeCl₃, c) CaCO₃, d) P₂O₅, e) NaCN,
f) N₂F₂, g) MgHPO₄, h) Cu(BrO₃)₂, i) K₂O, j) BF₃
2. Give the valence of a) Fe in FeO, b) Mn in MnO₂
3. Write formulas for: a) sodium oxide,
b) potassium iodide, c) plumbic sulfide,
d) mercury(I) oxide, e) ferrous oxide,
f) iron(II) phosphate, g) copper(II) fluoride,
h) dichlorine monoxide, i) silver sulfide,
j) magnesium nitride, k) aluminum hypochlorite,
l) iodine pentafluoride, m) calcium chromate,
n) diphosphorus pentasulfide

Naming Bases

- Bases contain an OH group
 - C₆H₁₂O₆ does not have an OH group
 - If an OH group is present it will be clearly indicated: e.g. NaOH, Ca(OH)₂
 - Also notice that bases have a metal (or positive ion such as NH₄⁺ at their beginning)
 - Bases are named like other ionic compounds:
+ve is named first, followed by the polyatomic ion
- Ca(OH)₂
CuOH
aluminum hydroxide
ammonium hydroxide

Naming Acids: Binary acids

- All acids start with H (e.g. HCl, H₂SO₄)
 - 2 acids types exist: binary acids and oxyacids
Binary: H + non-metal. E.g. HCl
Oxy: H + polyatomic ion. E.g. H₂SO₄
 - Each have different naming rules.
- Binary acids: naming depends on state of acid
- If it's not aqueous: hydrogen + non-metal
HCl(g) = hydrogen chloride
 - If it is aqueous: hydro + non-metal + ic acid
HCl(aq) = hydrochloric acid (aqueous hydrogen chloride)

HBr(s)

HI(aq)

H₂S(aq)

H₂S(g)

Naming Acids: Oxyacids

- Naming does not depend on the state (aq)
- 1) name the polyatomic ion
- 2) replace ate with ic, ite with ous
- 3) change non-metal root for pronunciation
- 4) add "acid" to the name

E.g. H₂SO₃

1) sulphite, 2) sulphous,

3) sulphurous, 4) sulphurous acid

HNO₂

hypochlorous acid

H₃PO₄(aq)

carbonic acid

Assignment: give formula or name

- a) chloric acid
- b) hydrosulfuric acid
- c) hydrobromic acid
- d) phosphorous acid
- e) iodic acid
- f) HCl(g)
- g) HCl(aq)
- h) H₂SO₄(s)
- i) H₂SO₄(aq)
- j) HClO₂
- k) HF(aq)

Hydrates

- Some compounds contain H₂O in their structure. These compounds are called hydrates.
- This is different from (aq) because the H₂O is part of the molecule (not just surrounding it).
- The H₂O can usually be removed if heated.
- A dot separates water: e.g. CuSO₄•5H₂O is copper(II) sulfate pentahydrate.
- A greek prefix indicates the # of H₂O groups.

Na₂SO₄•10H₂O

NiSO₄•6H₂O

sodium carbonate monohydrate

barium chloride dihydrate