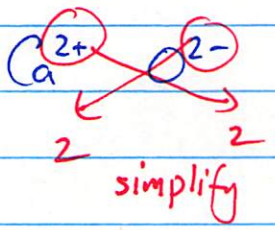
9/13/2019

Ca^{2+} O^{2-}

$\boxed{CaO}$ formula.



Naming ionic compounds

① cation name (+) – ② anion name (−)

(1) cation name (metals)

ex: element name!

Na^{+} = sodium

Mg^{2+} = magnesium

Al^{3+} = aluminum

however, some metal ions can take >1 charge!

- transition metals (except Ag^{+} Zn^{2+})
- "heavy metals"

$Ga^{3+/+}$

$In^{3+/+}$ $Sn^{4+/2+}$

$Tl^{3+/+}$ $Pb^{4+/2+}$

Sn^{4+} : tin (IV)

Sn^{2+} : tin (II)

element name ( )

↑ charge in Roman numerals.

Pb^{2+} lead (II)
Pb^{4+} lead (IV)

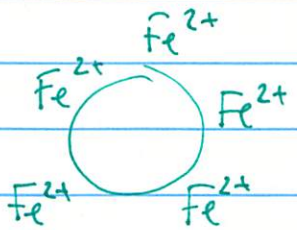
old method: use latin name + change ending to:

-ous (lower)
-ic (higher charge)

2 ones:

Cu^{+} ~ copper (I) : cuprous
copper / cuprum
Cu^{2+} ~ copper (II) : cupric

Fe^{2+} iron (II) : ferrous
iron / ferrum
Fe^{3+} iron (III) : ferric



2) Anion (non-metals)
(-) - use element name, but change ending to -ide

ex: F^{-}, ~~fluorine~~ ~~flourine~~ → fluoride

O^{2-}, oxygen → oxide

N^{3-}, nitrogen → nitride

MgO → Mg^{2+} O^{2-}

magnesium oxide

CaI_2 → Ca^{2+} I^- I^-

calcium iodide

$FeBr_2$ → $Fe^{?}$ Br^- Br^-

so, must be 2+

iron(II) bromide = $FeBr_2$

CuI ionic

Na_3N ionic

PO_3 not ionic

KBr ionic

Name: Li_3P , CuS

Li^+ Li^+ Li^+ P^{3-} phosphorus

lithium phosphide

$Cu^{?}$ S^{2-} → 2+

copper(II) sulfide

or cupric sulfide

Some ions have >1 atom: POLYATOMIC ions

TABLE 3.4 ■ Some Common Polyatomic Ions

Name	Formula	Name	Formula
Acetate	$C_2H_3O_2^-$	Hypochlorite	ClO^-
Carbonate	CO_3^{2-}	Chlorite	ClO_2^-
Hydrogen carbonate (or bicarbonate)	HCO_3^-	Chlorate	ClO_3^-
Hydroxide	OH^-	Perchlorate	ClO_4^-
Nitrite	NO_2^-	Permanganate	MnO_4^-
Nitrate	NO_3^-	Sulfite	SO_3^{2-}
Chromate	CrO_4^{2-}	Hydrogen sulfite (or bisulfite)	HSO_3^-
Dichromate	$Cr_2O_7^{2-}$	Sulfate	SO_4^{2-}
Phosphate	PO_4^{3-}	Hydrogen sulfate (or bisulfate)	HSO_4^-
Hydrogen phosphate	HPO_4^{2-}	Cyanide	CN^-
Dihydrogen phosphate	$H_2PO_4^-$	Peroxide	O_2^{2-}
Ammonium	NH_4^+		

the number of oxygen atoms in the ion. If there are only two ions in the series, the one with more oxygen atoms has the ending *-ate* and the one with fewer has the ending *-ite*. For example, NO_3^- is *nitrate* and NO_2^- is *nitrite*.

NO_3^- nitr*ate*

NO_2^- nitr*ite*

If there are more than two ions in the series, then the prefixes *hypo-*, meaning *less than*, and *per-*, meaning *more than*, are used. So ClO^- is hypochlorite (less oxygen than chlorite), and ClO_4^- is perchlorate (more oxygen than chlorate).

ClO^- *hypo*chlor*ite*

ClO_2^- *chlorite*

ClO_3^- chlor*ate*

ClO_4^- *per*chlor*ate*

sodium nitrite = Na^{+} NO_2^{-}

$NaNO_2$

calcium hydroxide = Ca^{2+} OH^{-}

$CaOH_2$ ×

$Ca(OH)_2$ ✓ use () for >1 polyatomic ion!