9/19/2018

Naming ionic cpds

name: ① Cation (+) ② Anion (−)
Metal Non-metals

Cation name:

(i) If metal only ever takes 1 charge, use element name.
(group IA, IIA, Al^{3+}, Zn^{2+}, Ag^{+})

ex: Na^{+} = sodium

ii) If metal has a variable charge, use element name plus charge in parentheses using Roman numerals.
(almost all transition metals, except Sc^{3+}, Zn^{2+}, Ag^{+} as well as 'heavy metals': Ga, In, Sn, Tl, Pb)

ex:
Cu^{+}	= copper(I)	cuprous	know ✓
Cu^{2+}	= copper(II)	cupric	know ✓
Fe^{2+}	= iron(II)	ferrous	know ✓
Fe^{3+}	= iron(III)	ferric	know ✓
Pb^{4+}	= lead(IV)		
Pb^{2+}	= lead(II)		

Note: older naming system uses Latin name + endings:
-ous (lower charge) -ic (higher charge)

2. Anion names

- use element name
  - change ending to "-ide"

ex: Cl^- chlor~~ine~~ ide chloride (table 3-2)

S^{2-} sulf~~ur~~ ide sulfide

O^{2-} ~~oxygen~~ ide oxide

ex: Name...

fluorine ✓ / ~~fl~~urine ✗

CaF_2

Ca^{2+} / F^- = calcium fluoride

CuS

Cu^{2+} S^{2-} = copper(II) sulfide

↑ figure out charge!

Na_2O

Na^+ O^{2-} = sodium oxide

Fe_3N_2

Fe^{2+} N^{3-} = iron(II) nitride

Fe^{2+} N^{3-}

Fe^{2+}

Polyatomic ions

contain 2 or more atoms w/ a charge.

Need to know the following: (table 3-4)

(1+) (1-)

NH_4^+
ammonium

$C_2H_3O_2^-$
acetate

NO_3^-
nitrate

HCO_3^-
bicarbonate/
hydrogen carbonate

NO_2^-
nitrite

CN^-
cyanide

OH^-
hydroxide

MnO_4^-
permanganate

(2-) (3-)

CO_3^{2-}	CrO_4^{2-}	PO_4^{3-}
carbonate	chromate	phosphate
SO_4^{2-}	$Cr_2O_7^{2-}$	
sulfate	dichromate	
SO_3^{2-}	O_2^{2-}	
sulfite	peroxide	

Note: -ate = "normal" # O's
-ite = 1 fewer O than "normal"

NO_3^- nitrate	SO_4^{2-} sulfate	CO_3^{2-} carbonate
NO_2^- nitrite	SO_3^{2-} sulfite	"CO_2^{2-} carbonite"

Naming ionic cpds w/ polyatomic ions

ex: $NaNO_2$

$Na^+ \; NO_2^-$ = sodium nitrite

$FePO_4$

$Fe^{3+} \; PO_4^{3-}$ = iron(III) phosphate

lithium cyanide

Li^+ CN^- → $LiCN$

iron(III) carbonate

use ( ) for >1 polyatomic!

Fe^{3+} CO_3^{2-} → $Fe_2(CO_3)_3$

2 : 3