

Roman Numerals

① = I or I

④ = IV or IV

⑦ = VII

9 = IX

② = II or II

⑤ = V or V

8 = VIII

10 = X

③ = III or III

⑥ = VI or VI

Name: _____

Blk: _____ Date: _____

Science 9

Names and Formulas of Ionic Compounds Continued

Steps for writing formulas of "complex" (multivalent)
metal ionic compound:

↳ many ↳ charge

Steps	Example 1: Iron (III) sulphide
1. Identify each <u>ion</u> and its appropriate <u>charge</u>	Iron (III) = Fe^{3+} Sulphide = S^{2-}
2. Determine the total charges needed to <u>balance</u> positive and negative ions (or do criss-cross method)	$+3 : (+3) \underline{2} = \underline{+6}$ $-2 : (-2) \underline{3} = \underline{-6}$ ↑
3. Note the <u>ratio</u> of positive ions to negative ions	<u>2</u> Fe and <u>3</u> S
4. Use ratio as <u>subscripts</u>	Fe_2S_3

Example 2: Lead (II) oxide

- Pb^{2+} and O^{2-}
- $(+2) \underline{1}$ $(-2) \underline{1}$
-
- PbO

Example 3: ~~Vanadium~~ Osmium IV oxide

- Os^{4+} and O^{2-}
- $(+4) \underline{1}$ $(-2) \underline{2} = \cancel{0}$
- $(+4) + (-4) = \cancel{0}$
- OsO_2

Now do Practice Problems page 89 #1 a - n

Steps for writing the name of a "complex" (multivalent) metal ionic compound:

Steps	Example 1. Cu_3P
1. Identify the <u>metal</u> and list the possible <u>charges</u>	Cu^{2+} or Cu^{1+}
2. Identify the <u>number</u> of the ions in the formula \uparrow	<u>3</u> Cu
3. Identify the <u>charge</u> on the <u>non-metal ion</u>	P^{3-}
4. The positive and negative charges must <u>BALANCE!</u> Determine what the charge on the metal ion must be to balance the non-metal	$\text{Cu}^{2+} : \frac{(+2)3}{+6} = +6$ $\text{Cu}^{1+} : \frac{(+1)3}{+3} = +3$ $\text{P}^{3-} : \frac{(-3)1}{-3} = -3$
5. Write out the compound name with the appropriate <u>metal ion charge</u> written as a <u>roman numeral</u>	<u>Copper I phosphide</u>

Example 2. MnO

1. \downarrow
2. Mn^{2+} or Mn^{3+} or Mn^{4+}
3. $+2$ $+3$ $+4$
4. O^{2-}
5. $(+2) + (-2) = 0$

Manganese II oxide

Example 3. SnO_2

1. Sn^{4+} or Sn^{2+}
2. Sn^{4+}
3. (O^{2-})
4. $(-2)2 = -4 = 0$

Tin IV oxide

Now do Practice Problems page 90 #1 a-o