


3.6 How Do We Predict Formulas and Name Ionic Compounds.

B *Transition Metals*

What is the correct chemical formula for the ionic compound Iron oxide?



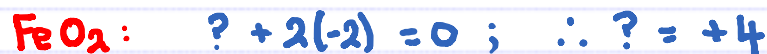
a) FeO
b) FeO₂
c) Fe₂O₃

The name given, **Iron oxide**, is ambiguous as you have no way to determine the charge on the metal - a **Transition metal** - based on the name.

Let's look at the 3 formulas given, and see if we can do better?



Iron (II) oxide



Iron (IV) oxide



Iron (III) oxide ... rust!

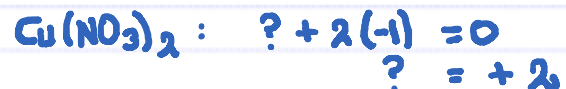
We use Roman Numerals to indicate the charge on Transition Metals.

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B Transition Metals

What is the correct name for the ionic compound $\text{Cu}(\text{NO}_3)_2$?

NO_3^- = nitrate



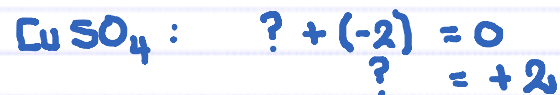
Copper (II) nitrate

What is the correct name for the ionic compound CuSO_4 ?



- a) Copper(I) sulfate
- b) Copper(I) sulfite
- c) Copper(II) sulfate ✓
- d) Copper(II) sulfite

SO_4^{2-} = sulfate



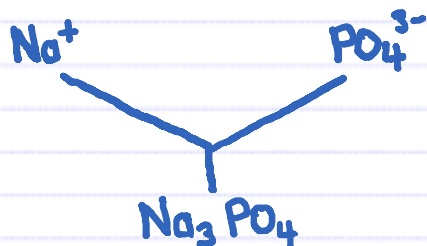
Copper (II) sulfate

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C Polyatomics

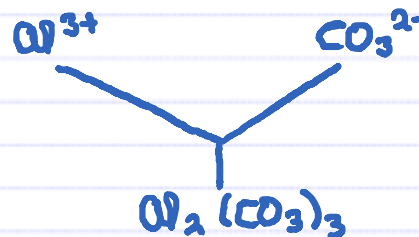
Give the correct chemical formula for the ionic compound, sodium phosphate.

Sodium : Group 1A ; +1
Phosphate: PO_4^{3-} ; -3

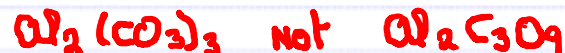


Give the correct chemical formula for the ionic compound, aluminum carbonate.

Aluminum : Group 3A ; +3
Carbonate : CO_3^{2-} ; -2



Note the use of parenthesis when there is more than one polyatomic in the formula.



4.3 What Is a Mole and How Do We Use It to Calculate Mass Relationships?

What is the mass in grams of 1 mole of Li.

${}^6\text{Li}$:	6.015 amu	7.42%
${}^7\text{Li}$:	7.016 amu	92.58%

$$N = 6.0221 \times 10^{23} \text{ mol}^{-1}$$

$$1 \text{ amu} = 1.6606 \times 10^{-24} \text{ g}$$

$$1 \text{ atom} : 0.0742(6.015) + 0.9258(7.016) = 6.9417 \text{ amu}$$

$$\frac{6.9417 \text{ amu}}{1} \times \frac{1.6606 \times 10^{-24} \text{ g}}{1 \text{ amu}} = 1.1527 \times 10^{-23} \text{ g}$$

! ↓

$$1 \text{ atom of Li} : 1.1527 \times 10^{-23} \text{ g}$$

$$1 \text{ mol of Li} : 1.1527 \times 10^{-23} \text{ g} (6.0221 \times 10^{23} \text{ mol}^{-1})$$

$$= 6.9417 \text{ g} \cdot \text{mol}^{-1}$$

4.3 What Is a Mole and How Do We Use It to Calculate Mass Relationships. Molar Mass ... (Formula Weight)

Al	Si	P	S
13	14	15	16
26.98	28.09	30.97	32.07

Al: 26.98 g.mol⁻¹

S: 32.07 g.mol⁻¹

$$\text{C}_4\text{H}_{10} : 4(\text{C}) + 10(\text{H}) \\ 4(12.01) + 10(1.01) = 58.14 \text{ g.mol}^{-1} \\ \text{MOLAR MASS}$$

$$\text{Reminder: } 58.14 \text{ g.mol}^{-1} = \frac{58.14 \text{ g}}{1 \text{ mol}}$$