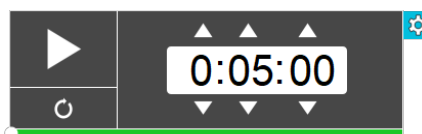
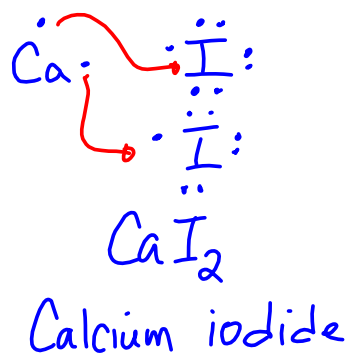
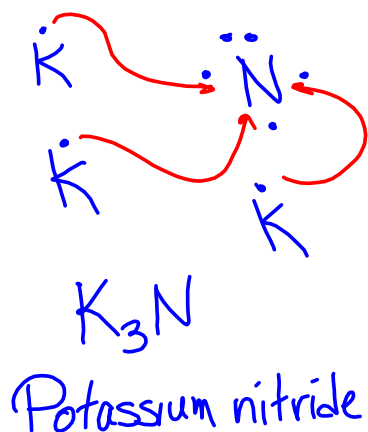


Warm Up



Show, using Lewis diagrams how the following elements form ionic compounds. Then write the chemical formula and the name.

- 1) Calcium and Iodine
- 2) Potassium and nitrogen



More complicated ions - the transition metals

If you look at iron on your periodic table it lists **two** possible ions: +3 and +2.

This first one listed is the **most common** ion.

Many of the transition metals (columns 3-12) have multiple ions possible (Chromium actually has 4, although only two are listed on your periodic table).

	iron	
26	+3, +2	
	Fe	
	55.85	

So, when we talk about iron oxide, how do we know which ion of iron it is?

Actually we put the ion charge in the name, like this:

iron (II) oxide
iron (III) oxide

ion charge

Iron (II) oxide has an iron **cation** of +2, where iron (III) oxide has an iron cation of +3. **Cation** is the term for a positive ion.

cat-ion

A negative ion is called
an **anion**
(ann-ion)

So what are the chemical formulas for iron (II) oxide and iron (III) oxide?

Iron (II) oxide

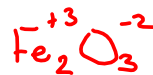


These can combine to give

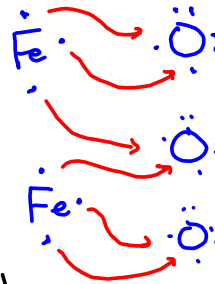


The total charge is ☺

Iron (III) oxide ← number of valence e⁻ in iron



$$2 \times (+3) + 3 \times (-2) = +6 + (-6) = \text{☺}$$

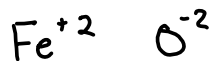


Another way, with a little math:
Least common multiple

$$\begin{array}{ll} +2, -2 & \text{LCM} = 2 \\ 2, 3 & \text{LCM} = 6 \\ 4, 6 & \text{LCM} = 12 \end{array}$$

$$\begin{array}{ll} 3, 4 & \text{LCM} = 12 \\ (1, 3) & \downarrow \\ & (1, 2, 4) \end{array}$$

Iron (II) oxide



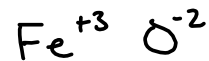
$$\text{LCM} = 2$$

need 1 Fe to make +2

need 1 O to make -2



Iron (III) oxide



$$\text{LCM} = 2 \times 3 = 6$$

need 2 Fe to make +6

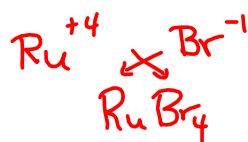
need 3 O to make -6



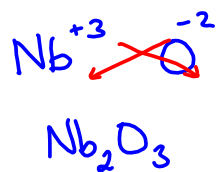
Your turn:

What is the chemical formula for

Ruthenium (IV) bromide?



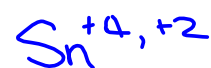
Niobium (III) oxide?



Naming transition metal ionic compounds from the chemical formula

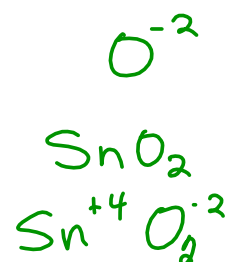
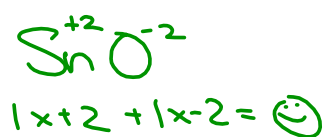
What is the chemical name for SnO_2 ?

tin(IV) oxide



What about SnO ?

tin(II) oxide



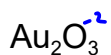
$$1 \times ? + 2 \times -2 = \text{☺}$$

$$? + -4 = \text{☺}$$

$$+4 = ?$$

Your turn

Name the following compounds:

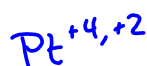
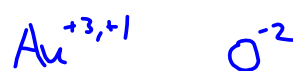


Gold (III) oxide

Platinum (IV) fluoride



Iridium bromide



iridium only has
1 ion charge (+4),
so we don't put
the roman numeral
in the name.

Polyatomic ions

Poly means *many* so polyatomic ions have multiple atoms. There are a few listed on the back of your periodic table.

For example OH^- is a polyatomic ion with oxygen and hydrogen with a -1 charge and is called *hydroxide*.

NaOH Sodium hydroxide

$\text{Ca}(\text{OH})_2$ Calcium hydroxide
← we have 2 of the things in the brackets

Note: If there are more than one ion group, we put the group in brackets and place the number *outside* the bracket.

What about the chemical formulas for polyatomic ions?

calcium acetate

ammonium oxide

Tomorrow - practice quiz for the quiz on Thursday