ChemQuest 26

Transition Metals

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hour: \_\_\_\_\_

**Information**: Charges of Some Transition Elements

So far you have learned that you can predict the charge that an ion will have based on its location on the periodic table. However, the transition elements are not easy to predict. A few common transition elements are listed below. You should memorize their charges.

Silver: Ag+ Zinc: Zn2+ Cadmium: Cd2+

# **Critical Thinking Questions**

* 1. Write the formulas for the following compounds:

a) silver nitrate b) zinc phosphate c) cadmium chloride

**Information**: More Than One Possible Charge

Many transition elements can have more than one charge when they become an ion. Copper ions, for example, can be Cu+ or Cu2+. As another example, iron ions are sometimes Fe2+ and sometimes Fe3+.

# **Critical Thinking Questions**

* 1. Copper and iron are in the “d block” and so you need to calculate their charge by comparing what bonds to them. Find the charge on copper and iron in each of the following compounds.

a) CuCl2 b) CuCl c) FeSO4 d) Fe2(SO4)3

* 1. Give your best attempt at naming the compounds from question 9. (They are rewritten below.)

a) CuCl2 b) CuCl c) FeSO4 d) Fe2(SO4)3

**Information**: Formulas Containing Roman Numerals

You probably put the same name for the compounds in question 3a and 3b. You may also have put the same name for the compounds in 3c and 3d. BUT these are not the same compound! You cannot have the same name for two different compounds. Here are the correct names for the compounds in questions 2 and 3:

a) CuCl2 b) CuCl c) FeSO4 d) Fe2(SO4)3

copper(II) chloride copper(I) chloride iron(II) sulfate iron(III) sulfate

# **Critical Thinking Questions**

* 1. Compare your answers for question 9 with the names of the compounds given in the information section. What do the Roman numerals stand for?
  2. Why is MnO2 called manganese(IV) oxide?
  3. Name the following compounds. *Note: assume that anytime you have a transition element (d block element) you must use a Roman numeral unless the element is silver, zinc, or cadmium.* (The first one is done for you.)

a) NiNO3 b) Cr2(CO3)3 c) FeNO3 d) CoCl2

*nickel(I) nitrate*

e) Cu3(PO4)2 f) MnS g) ZnCl2 h) AgNO3

* 1. Write the formulas for the following compounds. (The first one is done for you.)

a) mercury(II) acetate b) chromium(III) sulfate c) iron(I) carbonate

*Hg(C2H3O2)2*

d) potassium carbonate e) strontium nitride f) manganese(IV) chlorate

1. Look at the previous question, parts 7d and 7e. Notice how “potassium carbonate” and “strontium nitride” do NOT contain a Roman numeral in the name. The other names in question 7 all have a Roman numeral in the name. Why?
2. Name the following compounds. Only use a Roman numeral when necessary!

a) MgCl2 b) Mg(ClO3)2 c) MnCl2 d) MnClO3

e) Mn(ClO3)2 f) Rb2SO4 g) Rb2S h) Cr2(SO4)

1. Name the following compounds. All of them are transition metals, but you only need Roman numerals for a, NOT for b and c.

a) Ni(SO4)2 b) AgNO3 c) CdCl2

1. Why didn’t you need Roman numerals for b) and c) in question 10?