

Chemistry: Chemical Bonding Activity

Introduction

When atoms bond together to form ionic compounds, they will not combine with just any other atom. For example, two atoms that will never form an ionic bond are a sodium atom (Na) and a potassium atom (K). This is because both Na^{1+} and K^{1+} are cations, or positively-charged ions. In order for two atoms to form an ionic bond, one must be a cation (+ charge) and the other must be an anion (- charge). Remember, **opposite charges attract** each other and **similar charges repel** each other. Opposite charges can bond to each other, and similar charges cannot.

In this activity, you will get some practice in learning how atoms form ionic bonds. Listen carefully as the teacher explains the procedure, then begin.

Activity

1. potassium and bromine

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

2. potassium and oxygen

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

3. magnesium and bromine

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

4. aluminum and nitrogen

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

5. lead (IV) and nitrogen

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

6. copper (II) and hydroxide ion

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

7. ammonium ion and nitrate ion

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

8. calcium and phosphate ion

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

9. ammonium ion and phosphate ion

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

10. aluminum and oxygen

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

11 and 12. Make two compounds of iron and oxygen.

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

13 and 14. Make two compounds of lead and sulfur.

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

15 and 16. Make two compounds of copper and oxygen.

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

Ion Name	Ion Symbol	Anion/Cation	How Many?	Chemical Formula

Use the pieces to make one molecule (technically, the term should be "formula unit," since these are ionic compounds) of any five of the compounds and get your teacher's initials.

Chemical Formula of Compound

Teacher's Initials

- 1.
- 2.
- 3.
- 4.
- 5.

Questions

1. What was the overall charge on all of the molecules (formula units) that you constructed?
2. Compare your pieces with the Periodic Table and answer these questions.
 - a. Do nonmetals form anions or cations?
 - b. Do metals form anions or cations?
 - c. What is the charge for all of the elements in Group 1?
 - d. What is the charge for all of the elements in Group 2?
 - e. What is the charge for all of the elements in Group 17?
 - f. Do cation pieces fit with other cation pieces?
 - g. Do anion pieces fit with other anion pieces?
3. What type of elements (metals, metalloids, or nonmetals) form ionic bonds with metals?
4. What type of elements (metals, metalloids, or nonmetals) form ionic bonds with nonmetals?
5. Write the chemical formula that results when the following pairs of ions combine to form an ionic bond.
 - a. Sr^{2+} and O^{2-}
 - b. Mn^{4+} and O^{2-}
 - c. Li^{1+} and Cl^{1-}
 - d. Cs^{1+} and S^{2-}