

Simple Binary Ionic Compounds

Ionic compounds are compounds formed by the combination of a **cation** and a **anion**. (**Think: "metal plus nonmetal"**). Ionic compounds are more commonly known as "salts." Binary ionic compounds are compounds containing only two elements, as demonstrated in the examples below.

When writing formulas for ionic compounds, we use **subscripts** to indicate how many of each atom is contained in the compound. Remember that even though ions have charges, ionic compounds must be **neutral**. Therefore, the charges on the cation and the anion must cancel each other out. In other words, the **net charge** of an ionic compound equals zero.

Example 1:

For a salt containing sodium ion, Na^+ , and chloride, Cl^- , the ratio is one to one. The positive charge on the sodium ion cancels out the negative charge on the chloride.

$$(+1) + (-1) = 0$$

Therefore, the formula for the salt is **NaCl**. (The actual formula is Na_1Cl_1 , but chemists omit subscripts of 1).

Example 2:

For a salt containing calcium ion, Ca^{2+} , and chloride, Cl^- , the ratio can't be one to one.

$$(+2) + (-1) = +1$$

Remember that ionic compounds must be neutral. In order to yield a neutral compound, **two** chlorides must bond to the calcium ion:

$$(+2) + 2(-1) = 0$$

So, the formula for this salt is **CaCl₂**.

Nomenclature:

When naming ionic compounds, simply write the *element name* of the metal followed by the *ion name* of the nonmetal. (**Remember: the metal ion (cation) is always written first!**)

NaCl is called "**sodium chloride**," and CaCl_2 is called "**calcium chloride**."

Nomenclature Worksheet 2:
Simple Binary Ionic Compounds

Answer Key

Please complete the following table:

Name of Ionic Compound	Formula of Ionic Compound
1. Sodium bromide	NaBr
2. Calcium chloride	CaCl_2
3. Magnesium sulfide	MgS
4. Aluminum oxide	Al_2O_3
5. Lithium phosphide	Li_3P
6. Cesium nitride	Cs_3N
7. Potassium iodide	KI
8. Barium fluoride	BaF_2
9. Rubidium nitride	Rb_3N
10. Barium oxide	BaO
11. Potassium Oxide	K_2O
12. Magnesium Iodide	MgI_2
13. Aluminum Chloride	AlCl_3
14. Calcium Bromide	CaBr_2
15. Sodium Nitride	Na_3N
16. Lithium Fluoride	LiF
17. Barium Phosphide	Ba_3P_2
18. Cesium Sulfide	Cs_2S
19. Strontium Fluoride	SrF_2
20. Sodium Chloride	NaCl