

Naming Binary Ionic Compounds

Ck12 Science

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Naming Binary Ionic Compounds

Rules for naming monatomic metal and nonmetal ions.

Naming Binary Ionic Compounds



Do you know the proper name for this insect?

Proper naming is important for identification purposes. Medicine names must be precise so that the correct drug is given, one that will help the patient and not harm them. Biological classification of species requires accurate naming for proper categorization. The insect above has been properly categorized by genus and species, so it is uniquely identified. Names must be correct for the tracing family trees in genealogical studies. Compounds used in chemical reactions must be correctly specified in order for the reaction to occur.

Binary Ionic Compounds

A **binary** ionic compound is a compound composed of a **monatomic** metal **cation** and a monatomic nonmetal **anion**.

Naming Binary Ionic Compounds

When examining the formula of a compound in order to name it, you must first decide what kind of compound it is. For a binary ionic compound, a metal will always be the first element in the formula, while a nonmetal will always be the second. The metal

cation is named first, followed by the nonmetal anion. Subscripts in the formula do not affect the name. The **Table below** shows three examples:

Naming Binary Ionic Compounds

Formula	Name
KF	potassium fluoride
Na ₃ N	sodium nitride
Ca ₃ P ₂	calcium phosphide

Notice that in each of the formulas above, the overall charge of the compound is zero. Potassium ion is K^+ , while fluoride ion is F^- . Since the magnitude of the charges is equal, the formula contains one of each ion. This would also be the case for a compound such as MgS, in which the ions are Mg^{2+} and S^{2-} . For sodium nitride, the sodium ion is Na^+ , while the nitride ion is N^{3-} . In order to make a neutral compound, three of the 1^+ sodium ions are required in order to balance out the single 3^- nitride ion. So the Na is given a subscript of 3. For calcium phosphide, the calcium ion is Ca^{2+} , while the phosphide ion is P^{3-} . The least common multiple of 2 and 3 is 6. To make the compound neutral, three calcium ions have a total charge of 6^+ , while two phosphide ions have a total charge of 6^- . The Ca is given a subscript of 3, while the P is given a subscript of 2.

The video frame shows a chemistry lesson on naming ionic compounds. The background is a chalkboard with handwritten notes. The notes include "Ionic Compounds...", "metal cation", "nonmetal anion", "Cation - anion", "First name", "Last name", "Ca²⁺ Calcium", "Cl⁻ Chloride", and "Calcium chloride". There is also a small periodic table and a video of a person in the bottom right corner.

Summary

- A binary ionic compound is a compound composed of a monatomic metal cation and a monatomic nonmetal anion.

- The metal part of the compound is named as the element.
 - The non-metallic part of the compound is named by dropping the end of the element and adding *-ide*.
 - For binary compounds, it is not necessary to indicate the number of ions in the compound.
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Review

1. What is a binary compound?
 2. Which of the following is not a binary compound?
 - a. NaCl
 - b. KH_2PO_4
 - c. KBr
 3. Name the following compounds:
 - a. NaBr
 - b. MgCl_2
 - c. LiI
 - d. CaO
 - e. CuBr_2
 - f. FeO
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