

Part I: Naming Type I Ionic Compounds

1. There are some metal ions which have charges that are categorized as **Type I** ions and have charges which are *invariable*. Use this information to answer parts **a** and **b**.
- a. The charges from Group 1A and Group 2A are Type I ions, meaning that they are metals which have charges that are invariable. List these ions below along with their charges. The table below provides you with the atomic number. Fill in the missing information to identify each of these ions. The first row has been filled in as an example.

Atomic Number (z)	Element Symbol	Charge	Group Number	Group Name
3	Li	+1	1A	Alkali Metals
11				
19				
37				
55				
4				
12				
20				
28				
56				

- b. There are three additional Type I ions with the atomic numbers 13, 30, and 47. Identify these ions and their charges. Is there a way in which you can remember where these are and what their respective charges are?

Atomic Number (z)	Element Symbol	Charge
13		
30		
47		

We can work backwards to derive the underlying rules when naming ionic compounds. Being able to work backwards to derive the underlying rules will help if you are ever unsure of an ion's charge

CHEM 4 PAL— Naming Ionic Compounds

should you forget it. Learning the rules will also require you to memorize less information. For instance, instead of remembering all of the charges of the positively charged ions, we can just use the trends covered in **question 1** to know the charge.

Li_3N = lithium nitride

NaNO_3 = Sodium Nitrate

$\text{Mg}(\text{ClO}_4)_2$ = magnesium perchlorate.

2. The metal cation is positioned _____ and the non-metal anion is positioned _____.
 - a. What did we do to the name of the cation when it went from being a pure element to being part of a compound? *Hint*: Does the name change?

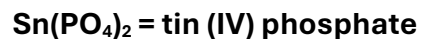
 - b. What did we do to the name of the monatomic anion when it went from being a pure element to being part of a compound?

3. What did we do to the name of the polyatomic anion when it became part of a compound?

4. When are parentheses used in writing the formulas of ionic compounds?

Part II: Naming Type II Ionic Compounds

A second type of metal ion is categorized as **Type II** ions, which have *variable* charges. Use the following examples of **Type II** ionic compounds as a guide to answer questions 5 and 6.



5. What are the cation charges in these two examples? Explain how you figured out each charge *based only on the formulas*.

charge on Cu =

explanation:

charge on Sn =

explanation:

6. How do we know what the charges of the cation are if we are only given the name of the ionic compound?

7. How can we easily determine the charge of the cation if we are only provided the formula?

CHEM 4 PAL— Naming Ionic Compounds

Part III: Check your current knowledge

8. Below is a list of ionic compounds identified by name. Provide the correct formula and identify whether it is a **type I** or **type II** ionic compound.

Name	Chemical Formula	Type I or Type II Ionic Compound?
Ex: Magnesium Perchlorate	$\text{Mg}(\text{ClO}_4)_2$	Type I
Silver Phosphate		
Magnesium Carbonate		
Chromium (II) Bicarbonate		
Magnesium Sulfite		
Cobalt (III) Carbonate		
Sodium Periodate		
Tin (III) Chromate		
Phosphorous Acid		
Magnesium Permanganate		
Chromium (III) Oxide		
Copper (II) Sulfate		
Ammonium Acetate		
Nickel (II) Iodide		
Barium Permanganate		

CHEM 4 PAL— Naming Ionic Compounds

9. Below is a list of ionic compounds identified by chemical formula. Provide the correct name and identify whether it is a **type I** or **type II** ionic compound.

Chemical Formula	Name	Type I or Type II Ionic Compound?
Ex: LiCl	Lithium Chloride	Type I
MgF ₂		
NCl ₆		
BaBr _l ₂		
HCl _(aq)		
KIO ₄		
Ca(NO ₃) ₂		
Co ₃ (SO ₄) ₃		
H ₃ PO _{4(aq)}		
Li ₂ Cr ₂ O ₇		
AgClO		
NO ₃		
Sr(NO ₃) ₂		
HNO _{3(aq)}		
Au(C ₂ H ₃ O ₂) ₃		

