**CHM 100: How to write the chemical formula of an ionic compound.**

## IDENTIFY THE CATION AND ANION

The formula of an ionic compound shows the smallest whole number ratio of cations and anions. The charges of all cations and anions in the formula must sum to zero

The *cation* is always written *first* in *both the name and the formula* of an ionic compound..

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### THE CATION

1) Most main-group metals: The charge on these metal ions can be found with the periodic table.

- Example: sodium ion = $Na^+$

2) Transition metals: The names of these metals are followed by a Roman numeral in parenthesis that indicates the *charge* on the metal ion.

- Example: iron(II) ion = $Fe^{2+}$

3) Polyatomic cations: You know only one polyatomic cation so far, and that's the ammonium ion.

- Example: ammonium ion = $NH_4^+$

### THE ANION

1) Monatomic anions: These are element stem names plus an "-ide" suffix. Find the charge of these ions with the periodic table.

- Example: sulfide ion = $S^{2-}$

2) Polyatomic anions: You have memorized a list of these, including their charges.

- Example: phosphate ion = $PO_4^{3-}$

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## WRITE THE FORMULA

To write the formula, find the smallest whole number ratio of cations and anions that makes the c*harges sum to a total of zero*. Don't write the charges on the ions in the final formula.

- Examples: iron(II) sulfate = $FeSO_4$ ($Fe^{2+}$ with $SO_4^{2-}$)
- magnesium chloride = $MgCl_2$ ($Mg^{2+}$ with $Cl^-$)
- aluminum nitrate = $Al(NO_3)_3$ ($Al^{3+}$ with $NO_3^-$)