



High School Science Virtual Learning

# Chemistry

## Naming Ionic Compound

May 20th, 2020



## Chemistry

Lesson: May 20th 2020

### **Objective/Learning Target:**

**The learner will be able to correctly name ionic compounds using the IUPAC Stock Naming system.**



## Bell Ringer

1. What is meant by an Ionic Compound?
2. How can you identify a compound as an Ionic Compound from its formula?



## Bell Ringer Answers:

1. An Ionic compound is composed of two or more charged particles, either atoms that have gained or lost electrons, or polyatomic ions.
2. Most Ionic compounds will start with a metal, if not they will start with  $H^+$  making them an acid, or Ammonium  $NH_4^+$  which is a positive polyatomic ion.

Binary Ionic compounds contain only 2 elements, a metal and a nonmetal. If the Charges are known it is fairly simple to name. You write the name of the metal followed by the non-metal, changing the suffix of the non-metal to “-ide” ex. Iodine would become Iodide.

Ex.  $\text{Rb}_2\text{Te} \rightarrow$  Rubidium Telluride

*Trends for Ionic Charge*

|    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |
|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|    |    | +1 |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     | 0   |     |
| 1  | 2  | +2 |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     | 3   |     |
| 3  | 4  | 5  | 6  |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     | 4   |     |
| 7  | 8  | 9  | 10 |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     | 5   |     |
| 11 | 12 | +3 |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     | 6   |     |
| 13 | 14 | 15 | 16 | 17 | 18 |    |    |    |    |    |     |     |     |     |     |     |     |     |     | 7   |     |
| 19 | 20 | +2 |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     | 8   |     |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32  | 33  | 34  | 35  | 36  |     |     |     |     | 9   |     |
| 37 | 38 | +1 |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     | 10  |     |
| 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50  | 51  | 52  | 53  | 54  |     |     |     |     | 11  |     |
| 55 | 56 | +1 |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     | 12  |     |
| 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68  | 69  | 70  | 71  | 72  | 73  | 74  | 75  | 76  | 77  | 78  |
| 87 | 88 | +1 |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     | 13  |     |
| 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 |

**Ternary Ionic Compounds** contain 3 or more elements. This will indicate that they have a **Polyatomic Ion**. Most polyatomic ions are negative (exception is  $\text{NH}_4^+$ ) so if the charge of the metal is known then you just write the name of the metal and the name of the ion. Example  $\text{Ca}(\text{NO}_3)_2$

Calcium Nitrate

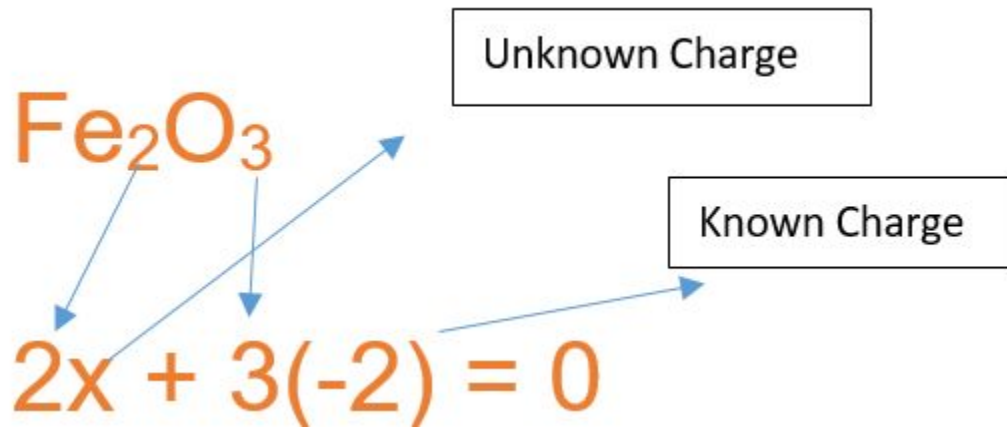
Common Polyatomic Ions

| Ion                       | Name                            |
|---------------------------|---------------------------------|
| $\text{Hg}_2^{2+}$        | mercury (I)                     |
| $\text{NH}_4^+$           | ammonium                        |
| $\text{NO}_2^-$           | nitrite                         |
| $\text{NO}_3^-$           | nitrate                         |
| $\text{SO}_3^{2-}$        | sulfite                         |
| $\text{SO}_4^{2-}$        | sulfate                         |
| $\text{HSO}_4^-$          | hydrogen sulfate<br>(bisulfate) |
| $\text{OH}^-$             | hydroxide                       |
| $\text{CN}^-$             | cyanide                         |
| $\text{PO}_4^{3-}$        | phosphate                       |
| $\text{HPO}_4^{2-}$       | hydrogen phosphate              |
| $\text{H}_2\text{PO}_4^-$ | dihydrogen phosphate            |

| Ion                                | Name                                |
|------------------------------------|-------------------------------------|
| $\text{NCS}^-$                     | thiocyanate                         |
| $\text{CO}_3^{2-}$                 | carbonate                           |
| $\text{HCO}_3^-$                   | hydrogen carbonate<br>(bicarbonate) |
| $\text{ClO}^-$                     | hypochlorite                        |
| $\text{ClO}_2^-$                   | chlorite                            |
| $\text{ClO}_3^-$                   | chlorate                            |
| $\text{ClO}_4^-$                   | perchlorate                         |
| $\text{C}_2\text{H}_3\text{O}_2^-$ | acetate                             |
| $\text{MnO}_4^-$                   | permanganate                        |
| $\text{Cr}_2\text{O}_7^{2-}$       | dichromate                          |
| $\text{CrO}_4^{2-}$                | chromate                            |
| $\text{O}_2^{2-}$                  | peroxide                            |
| $\text{C}_2\text{O}_4^{2-}$        | oxalate                             |



Many of the transition metals may have more than one oxidation number(ionic charge). In order to differentiate between these ions we indicate the charge with a roman numeral. In order to calculate the charge we use a little bit of Algebra. Remember that the overall charge of the compound must be zero. See how to work it out on the next slide.



$$2x - 6 = 0$$

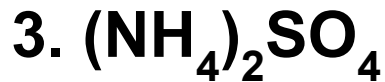
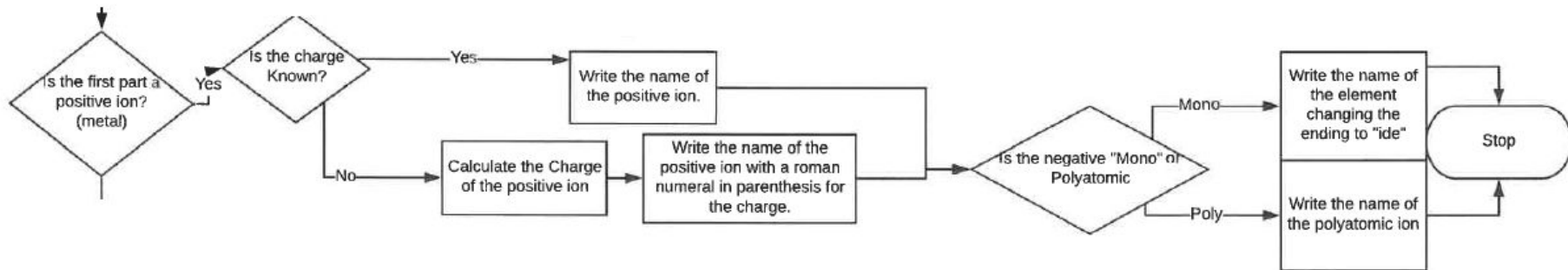
$$2x = 6$$

$$x = 3$$

In this case Iron will have a charge of +3 so the name of this compound is; Iron (III) Oxide



Use this portion of my flowchart to help name these ionic compounds.





## Answers

1. Aluminum Sulfide
2. Manganese (VII) Chloride
3. Ammonium Sulfate



If you need further explanation check out this video from Professor Dave Explains: [Naming Ionic Compounds \(5:43\)](#)

Then try this practice.

[Khan Academy](#)

[Quizizz](#)