Oxyanion Nomenclature

(Naming Oxyanions)

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Oxyanions

- Oxyanions are polyatomic ions involving one or more oxygen atoms plus another nonmetal atom.
- Oxyanions commonly have negative charges of –1, –2, and –3.
- Examples include:
  - CO_2^{2-} "Carbonate"
  - NO_2^- "Nitrite"
  - SO_4^{2-} "Sulfate"

General Rules for Naming Oxyanions

- Oxyanions are named according to the steps given below.
  1) Write the root of the name of the non-oxygen element
  2) Add the *–ate* or *–ite* suffix to the end of the name, according to the rule on the next slide.

- Examples:
  - NO_3^- Nitrogen is the non-oxygen element. Remove the –ogen and add –ate "nitrate"
  - SO_3^{2-} Sulfur is the non-oxygen element. Remove –ur and add –ite "sulfite"

Oxyanion Nomenclature Patterns

- Often, there will be more than one oxyanion involving a given element.
- The difference is the number of oxygen atoms bonded.
- For example:
  - NO_2^- (nitrite) and NO_3^- (nitrate)
  - SO_3^{2-} (sulfite) and SO_4^{2-} (sulfate)
- Notice that the **charge on the polyatomic ion is the same** for **both anions in the pair**.

Oxyanion Nomenclature (Naming)

- Compare the sets of oxyanions below. Notice the pattern in their names.
  - NO_2^- (nitrite) and NO_3^- (nitrate)
  - SO_3^{2-} (sulfite) and SO_4^{2-} (sulfate)
  - ClO_2^- (chlorite) and ClO_3^- (chlorate)

  - The one with fewer oxygens ends in ***-ite***.

  - The one with more oxygens ends in ***-ate***.

Naming Oxyanion Series

- Let's go back to the oxyanions involving chlorine below:
  - **ClO_2^- (chlorite) and ClO_3^- (chlorate)**
- **It turns out that two more anions exist**

ClO^- (hypochlorite) vs. ClO_4^- (perchlorate)

- The one with fewer oxygens than the ***–ite anion has a prefix hypo- added at the beginning of the name.***
- The one with more oxygens than the ***–ate anion has a prefix per- added at the beginning of the name.***

Mini Quiz

- Name the oxyanions given below:
  - BrO_2^-
  - BrO_3^-
  - PO_4^{3-}
  - CO_3^{2-}

Mini Quiz Solutions

- Name the oxyanions given below:
  - BrO_2^- (bromite)
  - BrO_3^- (bromate)
  - PO_4^{3-} (phosphate)
  - CO_3^{2-} (carbonate)

Mini Quiz

- Name the **series** of oxyanions given below:
  - IO^-
  - IO_2^-
  - IO_3^-
  - IO_4

Mini Quiz Solutions

- Name the series of oxyanions given below:
  - IO^- (hypoiodite)
  - IO_2^- (iodite)
  - IO_3^- (iodate)
  - IO_4^- (periodate)