Acid Nomenclature

(Naming Acids)

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Acid Overview

- Acids can easily be identified (most of the time) because the molecular formula begins with "H".
- Examples:
  - HBr (hydrobromic acid)
  - H_2SO_4 (sulfuric acid)
  - H_2CO_3 (carbonic acid)
  - HIO (hyperiodic acid)
- There are two types of acids that we will learn to name; those that include oxygen and those that do not.
- **Different naming rules apply to each case.**

Naming Acids With Oxygen

- Many acids are formed from an oxyanion bonded to hydrogen

- Some common examples are
  - H_2SO_4 (sulfuric acid)
  - H_2CO_3 (carbonic acid)
  - HIO_3 (iodic acid)

Naming Acids: Rule 1

- If the oxyanion in the acid ends in ***-ate***, change the ending to ***–ic, then add the word "acid."***
- **Examples:**
  - $HClO_3$: The anion is ClO_3^- (chlorate)

    Name the acid by removing –ate and adding –ic, then add the word "acid" → chloric acid

  - $HClO_4$: The anion is ClO_4^- (perchlorate)

    Name the acid by removing –ate and adding –ic, then add the word "acid" → perchloric acid

Naming Acids: Rule 2

- If the oxyanion in the acid ends in ***-ite***, change the ending to ***-ous, then add the word "acid."***
- **Examples:**
  - $HClO$: The anion is ClO^- (hypochlorite)

  Name the acid by removing -ite and adding -ous, then add the word "acid" → hypochlorous acid

  - $HClO_2$: The anion is ClO_2^- (chlorite)

  Name the acid by removing -ite and adding -ous, then add the word "acid" → chlorous acid

Naming Acids Without Oxygen (Rule 3)

- Acids also form from anions with –ide ending (monatomic or polyatomic anions, such as cyanide CN^-)

- Examples of monatomic anions:
  - Chloride (Cl^-)
  - Sulfide (S^{2-})
  - Iodide (I^-)

- The corresponding acids would be
  - HCl: Hydrochloric acid
  - H_2S: Hydrosulfuric acid
  - HI: Hydroiodic acid

Naming Acids (Rule 3)

- Name acids formed from monatomic anions (or polyatomics without oxygen) with –ide ending using the following guidelines:
  a) Change the ***–ide*** *ending on the anion* to ***–ic***
  b) Add the prefix ***hydro-*** (to the beginning of the name)
  c) Add the word "acid" to the end of the name.

- Examples:
  - For an acid made form chloride (Cl^-):
    - remove the –ide ending and add –ic
    - *Add the prefix hydro-*
    - Add the word "acid"

hydrochloric acid

Examples: Naming Acids (Rule 3)

- More examples:
  - For an acid made form sulfide (S^{2-}):
    - remove the –ide ending and add –ic
    - *Add the prefix hydro-*
    - Add the word "acid"

*hydro***sulfuric** acid

  - For an acid made form fluoride (F^{-}):
    - remove the –ide ending and add –ic
    - *Add the prefix hydro-*
    - Add the word "acid"

*hydro***fluoric** acid

Mini Quiz

- Name the following acids:
  - $HBrO_2$
  - HCN
  - H_3PO_4
  - H_2CO_3

Mini Quiz Solutions

- Name the following acids:

  - $HBrO_2$

    The anion name is bromite; an oxyanion.
    Remove the –ite and add the –ous ending
    Now add the word "acid"

    Bromous acid

Mini Quiz Solutions

- Name the following acids:

  - HCN

    The anion name is cyanide; a polyatomic ion that does not contain oxygen.

    Remove the –ide and add the –ic ending
    Add the prefix *hydro-*
    Now add the word "acid"

    hydrocyanic acid

Mini Quiz Solutions

- Name the following acids:

  - H_3PO_4

  The anion name is phosphate; an oxyanion.

  Remove the –ate and add the –ic ending
  Add the word "acid"

  Phosphoric acid

Mini Quiz Solutions

- Name the following acids:

  - H_2CO_3

  The anion name is carbonate; an oxyanion.

  Remove the –ate and add the –ic ending
  Add the word "acid"

  Carbonic acid