

# CHEMISTRY

# NOMENCLATURE OF INORGANIC ACIDS

At this very beginning level, you will recognize an acid by the fact that its formula starts with H, as in these examples:

HCl  
HNO<sub>3</sub>  
H<sub>2</sub>SO<sub>4</sub>  
HClO<sub>3</sub>  
H<sub>3</sub>BO<sub>3</sub>

As you become more sophisticated in your chemistry, you will realize that there are many acid formulas that do not start with H, but those will almost all be left for another time.

There is one exception to this: the formula CH<sub>3</sub>COOH should be recognized as acetic acid. The particular way it is written is common in organic chemistry. An alternate way to write acetic acid is HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub>. This is done in the inorganic style which you are currently studying.

One last comment before looking at how to name acids: the formula H<sub>2</sub>O should not be considered an acid. It is the formula for water. It is not an acid. When you study acid-base behavior later in the school year, you will learn more about water's role in acid-base chemistry, but not now.

## Naming Acids

In order to explain acid naming, the sequence of HCl, HClO, HClO<sub>2</sub>, HClO<sub>3</sub>, and HClO<sub>4</sub> will be discussed in order.

HCl is a binary acid. All binary acids are named the same way:  
the prefix "hydro" is used.  
the root of the anion is used.  
the suffix "ic" is used.  
the word "acid" is used as the second word in the name.

The name for HCl is hydrochloric acid. Other binary acids you are responsible for are HF, HBr, HI, and H<sub>2</sub>S.

1) HClO is an acid involving a polyatomic ion. You MUST recognize the polyatomic ion in the formula. There is no other way to figure out the name. If you don't recognize the polyatomic, then you're sunk without a trace.

The polyatomic ion is ClO and its name is hypochlorite. Any time you see the "ite" suffix, you change it to "ous" and add the word acid.

The name of HClO is hypochlorous acid.

2) HClO<sub>2</sub> has the ClO<sub>2</sub> polyatomic ion in it. The name of this ion is chlorite.

Since the "ite" suffix is used, it gets changed to "ous."

The name of HClO<sub>2</sub> is chlorous acid.

3) HClO<sub>3</sub> has the ClO<sub>3</sub> polyatomic ion and its name is chlorate. Any time you know the "ate" ending is used on the polyatomic, you use "ic" when you write the corresponding acid formula.

The name of HClO<sub>3</sub> is chloric acid.

4) HClO<sub>4</sub> has the ClO<sub>4</sub> polyatomic ion and its name is perchlorate.

Since the "ate" suffix is used, it gets changed to "ic."

The name of HClO<sub>4</sub> is perchloric acid.

There are two keys; you have to:

1. recognize when a polyatomic is present
2. know its name.

Only then can you know to change the "ite" suffix to "ous" and the "ate" suffix to "ic" when it is an acid.

## Practice Problems

Name the following acids:

- 1) H<sub>3</sub>PO<sub>4</sub>
- 2) H<sub>2</sub>CO<sub>3</sub>
- 3) H<sub>2</sub>SO<sub>4</sub>
- 4) HIO<sub>3</sub>
- 5) HF
- 6) HNO<sub>2</sub>

Write the formula for these acids:

- 7) hydrobromic acid
- 8) hydrocyanic acid [this has a twist in it]
- 9) nitric acid
- 10) sulfurous acid
- 11) phosphorous acid
- 12) acetic acid