

## NAMES AND FORMULAS OF ACIDS

An acid is presently defined to be a substance which gives rise to  $H^+$  when dissolved in water. In addition to  $H^+$ , the acid will also give rise to an anion. The name of the acid itself is based on the name of the anion involved. There are three types of anions to consider, based on their names.

### 1. Anions whose name normally ends in "-ide".

Acids derived from anions whose ordinary name ends in "-ide" are named by changing "-ide" to "-ic acid", and by adding the prefix "hydro-". The following are examples; others also fall in this category.

HBr, hydrobromic acid                      (The anion is bromide,  $Br^-$ .)

HCN, hydrocyanic acid                      (The anion is cyanide,  $CN^-$ .)

For HI, the name is hydroiodic acid or hydriodic acid; both are used.

### 2. Anions whose name normally ends in "-ate".

Acids derived from anions whose ordinary name ends in "-ate" are named by changing "-ate" to "-ic acid". The following are examples; others also fall in this category.

$HClO_3$ , chloric acid                      (The anion is chlorate,  $ClO_3^-$ .)

$H_2C_2O_4$ , oxalic acid                      (The anion is oxalate,  $C_2O_4^{2-}$ .)

### 3. Anions whose name normally ends in "-ite".

Acids derived from anions whose ordinary name ends in "-ite" are named by changing "-ite" to "-ous acid". The following are examples; others also fall in this category.

HClO, hypochlorous acid                      (The anion is hypochlorite,  $ClO^-$ .)

$HClO_2$ , chlorous acid                      (The anion is chlorite,  $ClO_2^-$ .)

While many acids follow the above naming system, there are two quirks to be aware of. These relate to the common oxyacids of S and P, for which an extra syllable is added.

$H_2SO_4$ , sulfuric acid (not sulfic acid)

$H_3PO_4$ , phosphoric acid (not phosphic acid)

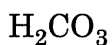
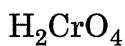
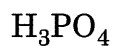
When writing the formula for an acid, note that the number of H's in the formula is the same as the negative charge of the anion.

nitric acid            The anion is nitrate,  $\text{NO}_3^-$ . One  $\text{H}^+$  is required for the neutral acid. The formula is  $\text{HNO}_3$ .

arsenic acid            The anion is arsenate,  $\text{AsO}_4^{3-}$ . Three  $\text{H}^+$  are required for the neutral acid. The formula is  $\text{H}_3\text{AsO}_4$ .

carbonic acid            The anion is carbonate,  $\text{CO}_3^{2-}$ . Two  $\text{H}^+$  are required for the neutral acid. The formula is  $\text{H}_2\text{CO}_3$ .

**PRACTICE PROBLEMS.** Name the following acids from the given formulas.



**PRACTICE PROBLEMS.** Give the formula for the following acids.

sulfuric acid

hydrochloric acid

nitric acid

oxalic acid

hydrocyanic acid

hypochlorous acid

acetic acid

chloric acid