

The Polyatomic Ions: **Hydroxide, Cyanide, Peroxide**

There are three polyatomic ions that end in -ide. Hydroxide and peroxide both have oxide in their names and oxygen in their formulas. Per means hyper. It is a shortened form of the word hyper. **Peroxide** is hyper oxygen. Its formula is O_2^{2-} . Here is a little rhyme to remember this formula:

Hyper, hyper peroxide
Too, too oxide
Oh my, two minus
Oh two two minus

The word **hydroxide** is made from hydro and oxide. The root hydro means water as in fire hydrant, hydroelectric power, hydrated or dehydrated. Hydroxide is formed from water with one of the hydrogen atoms removed. H_2O is water and OH^{1-} is hydroxide.

Cyanide is carbon and nitrogen. In Spanish the letter "y" means "and" so you can remember C y a N ide as Carbon and and Nitrogen because the letters "C" and "N" are in the word cyanide.

The three polyatomic ions do not all have the same charge. Hydroxide and Cyanide have a one minus charge. Peroxide has a two minus charge.

Compounds formed from these ions:

When hydroxide is combined with hydrogen then the result is water.

OH^{1-} and H^{1+} make **H_2O**

When cyanide is combined with hydrogen then the result is hydrogen cyanide – a deadly gas:

CN^{1-} and H^{1+} make **HCN** . If this gas is dissolved in water the result is hydrocyanic acid.

When peroxide is combined with hydrogen the result is hydrogen peroxide – a popular disinfectant.

O_2^{2-} and two H^{1+} make **H_2O_2** and this is the formula for hydrogen peroxide.

All of these ions also combine with the sodium cation: Na^{1+}

Sodium hydroxide: $NaOH$ also known as lye – very caustic (crystal drano)

Sodium cyanide: $NaCN$ – very poisonous

Sodium peroxide: Na_2O_2 – very flammable

These ions combine with other metal ions as well. Just remember that the charge on the cations must equal the charge on the anions. Here are some examples:

$Ca(OH)_2$ is calcium hydroxide.

$Fe(CN)_3$ is iron (III) cyanide.

MgO_2 is magnesium peroxide.