

OXY-ACID FAMILIES AND THEIR RELATED COMPLEX IONS

An oxyacid is when an acid has more than one other atom along with hydrogen, and these atoms are combined in a polyatomic anion.

The oxyacids contain the oxyanion.

The five main oxyacids are:

— ic acid	Formula	one less oxygen — ous acid	two less oxygens hypo ___ous acid	one more oxygen per ___ic acid
Chloric acid	HClO₃	HClO₂	HClO	HClO₄
Nitric acid	HNO₃			
Carbonic acid	H₂CO₃			
Sulphuric acid	H₂SO₄			
Phosphoric acid	H₃PO₄			

From each of the Famous Five oxy-acids, a family of acids and complex ions may be derived and named using a simple set of rules. Some of the derivatives do not actually exist but that does not matter at this point in your study of chemistry.

The complex polyatomic anion produced from the **— ic acid** is the **— ate**

<u>ACID</u>	<u>Formula</u>	<u>Oxyanion</u>	<u>Formula of Oxyanion</u>
Chloric acid	HClO ₃	Chlorate	ClO ₃ ⁻¹
Nitric acid	HNO ₃	Nitrate	NO ₃ ⁻¹
Carbonic acid	H ₂ CO ₃		
Sulphuric acid			
Phosphoric acid			

The complex polyatomic anion produced from the **— ous acid** is the **— ite**
(one less oxygen than – ic acid)

<u>ACID</u>	<u>Formula</u>	<u>Oxyanion</u>	<u>Formula of Oxyanion</u>
Chlorous acid	HClO ₂	Chlorite	ClO ₂ ⁻¹
Nitrous acid	HNO ₂	Nitrite	NO ₂ ⁻¹
Carbonous acid	H ₂ CO ₂		
Sulphurous acid			
Phosphorous acid			

The complex polyatomic anion produced from the **hypo_____ous acid** is the **hypo_____ite**
(two less oxygen than – ic acid)

<u>ACID</u>	<u>Formula</u>	<u>Oxyanion</u>	<u>Formula of Oxyanion</u>
Hypochlorous acid	HClO	hypochlorite	ClO ⁻¹
Hyponitrous acid	HNO	hyponitrite	NO ⁻¹
hypocarbonous acid	H ₂ CO		

hyposulphurous acid

hypophosphorous acid

The complex polyatomic anion produced from the **per_____ic acid** is the **per_____ate**
(one more oxygen than – ic acid)

<u>ACID</u>	<u>Formula</u>	<u>Oxyanion</u>	<u>Formula of Oxyanion</u>
perchloric acid	HClO ₄	perchlorate	ClO ₃ ⁻¹
pernitric acid	HNO ₄	pernitrate	NO ₃ ⁻¹
percarbonic acid	H ₂ CO ₄		
persulphuric acid			
perphosphoric acid			

Oxy-acid

Formula



Oxy-acid

Name

Pernitric acid

Nitric acid

Nitrous acid

Hyponitrous acid

Perchloric acid

Chloric acid

Chlorous acid

Hypochlorous acid

Percarbonic acid

Cabonic acid

Carbonous acid

Hypocarbonous acid

Persulphric acid

Sulfuric acid

Sulfurous acid

Hyposulfurous acid

Perphosphoric acid

Phosphoric acid

Phosphorous acid

Hypophosphorous acid

Complex

Ion



Complex Ions

Names

Pernitrate

Nitrate

Nitrite

Hyponitrite

Perchlorate

Chorate

Chlorite

Hypochlorite

Percarbonate

Cabonate

Carbonite

Hypocarbonite

Persulfate

Sulfate

Sulfite

Hyprcarbonite

Perphosphate

Phosphate

Phosphite

Hypophosphite

NOTE: The **parent** oxy-acid is in bold font in the left-hand column. The names of the oxy-acids and complex ions that **do** exist (according to the **Handbook of Chemistry and Physics**; Pg. B-70 in the 61th edition) are in bold font in the second and fourth columns.

* If you substitute any of the other halogens (fluorine, bromine or iodine) for chlorine in HClO₃, you produce HFO₃, fluoric acid, HBrO₃, bromic and HIO₃, iodic acid. Each of these also produces a family of acids similar to the family produced from HClO₃.