

# Oxidation Numbers

## A short list

### Monatomic ions

**+1**

*all the alkali metals show the +1 oxidation state only*

Cu <sup>+1</sup>	copper (I) , cuprous	H <sup>+1</sup>	hydrogen
Au <sup>+1</sup>	gold (I)	Li <sup>+1</sup>	lithium
Ag <sup>+1</sup>	silver	Na <sup>+1</sup>	sodium
Tl <sup>+1</sup>	thallium (I)	K <sup>+1</sup>	potassium
Hg <sub>2</sub> <sup>+2</sup>	mercury (I), mercurous	Rb <sup>+1</sup>	rubidium
		Cs <sup>+1</sup>	cesium

**+2**

*all the alkaline earth metals show the +2 oxidation state only*

Cu <sup>+2</sup>	copper (II), cupric	Be <sup>+2</sup>	beryllium
Fe <sup>+2</sup>	iron (II), ferrous	Ca <sup>+2</sup>	calcium
Pb <sup>+2</sup>	lead (II), plumbous	Mg <sup>+2</sup>	magnesium
Sn <sup>+2</sup>	tin (II), stannous	Sr <sup>+2</sup>	strontium
Cr <sup>+2</sup>	chromium (II)	Ba <sup>+2</sup>	barium
Ni <sup>+2</sup>	nickel (II)	Ra <sup>+2</sup>	radium
Zn <sup>+2</sup>	zinc	Cd <sup>+2</sup>	cadmium
Cd <sup>+2</sup>	cadmium	Hg <sup>+2</sup>	mercury (II), mercuric
Mn <sup>+2</sup>	manganese (II)	Co <sup>+2</sup>	cobalt (II), cobaltous

**+3**

*all the IIIA elements exhibit the +3 state, but Tl exhibits +1 as well*

Fe <sup>+3</sup>	iron (III), ferric	B <sup>+3</sup>	boron
Cr <sup>+3</sup>	chromium (III)	Al <sup>+3</sup>	aluminum
Ni <sup>+3</sup>	nickel (III)	Ga <sup>+3</sup>	gallium
Co <sup>+3</sup>	cobalt (III), cobaltic	In <sup>+3</sup>	indium
Au <sup>+3</sup>	gold (III)	Tl <sup>+3</sup>	thallium (III)
Ti <sup>+3</sup>	titanium (III)	Sc <sup>+3</sup>	scandium

**+4**

*all elements in IVA exhibit the +4 state, but some in IVA exhibit more than one state*

C <sup>+4</sup>	carbon	Sn <sup>+4</sup>	tin (IV), stannic
Si <sup>+4</sup>	silicon	Pb <sup>+4</sup>	lead (IV), plumbic
Ge <sup>+4</sup>	germanium	Ti <sup>+4</sup>	titanium (IV)
Mn <sup>+4</sup>	manganese (IV)		

**-1**

*all the halogens exhibit the -1 state; several exhibit + states in covalent compounds*

F <sup>-1</sup>	fluoride	I <sup>-1</sup>	iodide
Cl <sup>-1</sup>	chloride	H <sup>-1</sup>	hydride
Br <sup>-1</sup>	bromide		

**-2**

*all the chalcogens exhibit the -2 state for ionic compounds; several exhibit + states in covalent compounds*

O <sup>-2</sup>	oxide	Se <sup>-2</sup>	selenide
S <sup>-2</sup>	sulfide	Te <sup>-2</sup>	telluride

-3

some of the VA elements exhibit the -3 state for ionic compounds; several exhibit + states in covalent compounds

$N^{-3}$	nitride
$P^{-3}$	phosphide

-4

only carbon exhibits the -4 state for a limited number of ionic compounds

$C^{-4}$	carbide
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### Polyatomic ions

+1

the only commonly encountered ion is the ammonium ion

$NH_4^+$	ammonium
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-1

$(NO_2)^{-1}$	nitrite	$(ClO_4)^{-1}$	perchlorate
$(NO_3)^{-1}$	nitrate	$(ClO_3)^{-1}$	chlorate
$(HSO_4)^{-1}$	hydrogen sulfate, bisulfate	$(ClO_2)^{-1}$	chlorite
$(HCO_3)^{-1}$	hydrogen carbonate, bicarbonate	$(ClO)^{-1}$	hypochlorite
$(HSO_3)^{-1}$	hydrogen sulfite, bisulfite	$(IO_3)^{-1}$	iodate
$(MnO_4)^{-1}$	permanganate	$(BrO_3)^{-1}$	bromate
$(OH)^{-1}$	hydroxide	$(C_2H_3O_2)^{-1}$	acetate
$(CN)^{-1}$	cyanide	$(H_2PO_4)^{-1}$	dihydrogen phosphate

-2

$(SO_4)^{-2}$	sulfate	$(CO_3)^{-2}$	carbonate
$(CrO_4)^{-2}$	chromate	$(SiF_6)^{-2}$	hexafluorosilicate
$(Cr_2O_7)^{-2}$	dichromate	$(C_4H_4O_6)^{-2}$	tartrate
$(C_2O_4)^{-2}$	oxalate	$(HPO_4)^{-2}$	hydrogen phosphate

-3

$(PO_4)^{-3}$	phosphate	$(AsO_4)^{-3}$	arsenate
$(PO_3)^{-3}$	phosphite		

### *ACIDS (aq)*

$H_2SO_4$	sulfuric	$HNO_3$	nitric
$H_2SO_3$	sulfurous	$HNO_2$	nitrous
$H_2CO_3$	carbonic	$HC_2H_3O_2$	acetic
$H_3PO_4$	phosphoric	$H_3BO_3$	boric
$H_3PO_3$	phosphorous	$H_2C_2O_4$	oxalic
$HClO_4$	perchloric	$HCl$	hydrochloric
$HClO_3$	chloric	$HBr$	hydrobromic
$HClO_2$	chlorous	$HF$	hydrofluoric
$HClO$	hypochlorous	$HI$	hydroiodic
		$HCN$	hydrocyanic

$H_2SO_4$ ,  $HClO_4$ ,  $HClO_3$ ,  $HNO_3$ ,  $HCl$ ,  $HBr$ ,  $HI$  can be considered to be strong acids, ionizing completely in most cases; the rest are weak acids.