

## Oxidation Numbers

Any element in its free (uncombined) state	0
Group IA metals	+1 always
Group IIA metals	+2 always
Fluorine	-1 always
Cl, Br, I	-1 EXCEPT when attached to a more electronegative element (F, O)
Oxygen	-2 EXCEPT peroxides $O_2^{2-}$ superoxides $O_2^-$
Group VIA nonmetals	-2 <i>in binary ionic compounds</i>
Group VA nonmetals	-3 <i>in binary ionic compounds</i>
Al	+3
Zn	+2
Cd	+2
Ag	+1
H	+1 EXCEPT when attached to a metal, then -1

### Common metal ions with variable oxidation numbers

+1 (-ous) +2 (-ic)	+2 (-ous) +3 (-ic)	+2 (-ous) +4 (-ic)
$Cu^+$ copper (I) <i>cuprous</i>	$Co^{2+}$ cobalt (II) <i>cobaltous</i>	$Pb^{2+}$ lead (II) <i>plumbous</i>
$Cu^{2+}$ copper (II) <i>cupric</i>	$Co^{3+}$ cobalt (III) <i>cobaltic</i>	$Pb^{4+}$ lead (IV) <i>plumbic</i>
$Hg_2^{2+}$ mercury (I) <i>mercurous</i>	$Fe^{2+}$ iron (II) <i>ferrous</i>	$Sn^{2+}$ tin (II) <i>stannous</i>
$Hg^{2+}$ mercury (II) <i>mercuric</i>	$Fe^{3+}$ iron (III) <i>ferric</i>	$Sn^{4+}$ tin (IV) <i>stannic</i>