Predicting redox reactions

- Single replacement reactions we went over a few chapters ago are all redox reactions.
- Here are the same examples, this time write out the net ionic equation
- The change will be the charge!!

Examples

- Zinc is added to a solution of cobalt (II) chloride
- Lithium is added to a solution of nickel (II) chlorate

Examples

- Potassium is added to sulfuric acid
- Chlorine gas is bubbled through a solution of sodium bromide

Common Oxidizing/reducing agents

Oxidizing agent	Product	Reducing Agent	Product
MnO_4^- in acid	Mn^{2+}	H_2O_2	O_2
MnO_2 in acid	Mn^{2+}	Halogens (dilute basic)	Hypohalite ion (hypochlorite)
MnO_4^- in base	MnO_2		
CrO_4^{2-} in acid	Cr^{3+}	halogens (conc basic)	Halate ion (chlorate)
$Cr_2O_7^{2-}$ in acid	Cr^{3+}		
$HClO_4$	Cl^-	Free metals	Metal ions
Na_2O_2	NaOH		
H_2O_2	H_2O	$C_2O_4^{2-}$	CO_2
H_2SO_4 conc.	SO_2	Sulfite or SO_2	SO_4^{2-}
Free halogens	Halide ion	Halide ion	Free halogen
HNO_3 conc.	NO_2	NO_2^-	NO_3^-
HNO_3 dilute	NO		
Metal ions	Lower oxidation number	Metal ion	Higher oxidation number

IMPORTANT

- For every redox equation, you have to have both an oxidizing agent and a reducing agent!!
- Otherwise it doesn't work.

Examples

- Bromate reacts with bromide in an acidic solution
- Permanganate reacts with oxalate in an acidic solution
- Calcium metal reacts with permanganate in a sodium hydroxide solution

Example

- Chromate reacts with chloride in an acidic solution
- Chlorine reacts with permanganate in a concentrated solution of sodium hydroxide