

Oxidation: loss of electrons eg. $\text{Mg} \rightarrow \text{M}^{2+} + 2\text{e}^-$

Reduction: gain of electrons eg. $\text{O} + 2\text{e}^- \rightarrow \text{O}^{2-}$

OIL RIG

Oxidation Rules:

- Group 1 elements have an oxidation of +1
- Group 2 elements have an oxidation of +2
- Aluminum +3
- Silver +1
- Hydrogen +1, except if it is combined with a metal, then it is -1
- Oxygen -2, except if it is a peroxide (1 extra oxygen), then it is -1
- Sum of oxidation numbers in a molecule is always equal to 0
- In a polyatomic ion, the sum of oxidation numbers is equal to the charge on the ion

$$\begin{array}{rcll} \text{eg. HNO}_3 & \text{H} + \text{N} + 3(\text{O}) & = & 0 \\ & +1 \quad ? \quad -2 & & \\ & & & = -6 \end{array}$$

- anything oxidized acts as reducing agent
- more reactive the metal, better the reducing agent

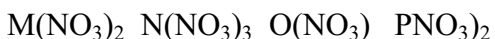
Activity Series

Metals:

top to bottom, reactive to unreactive

The more reactive a metal is the greater is its ability to displace another metal from a substance

eg. Metals: M N O P



1. N placed in O and M -- all reacted
2. P placed in M, N, and O -- no reactions
3. M placed in N and O -- reaction in O, not N

Therefore, N – M – O – P

Halogens:

exact same as metals, except reversed order

Balancing Equations:

- equal number of specific atoms on both sides of equation

Rules:

1. Write the equation with the reactants on the left and the product on the right
2. Balance the atoms that only occur in one molecule on each side by choosing your appropriate coefficient.
3. Balance atoms, one kind at a time.
4. Balance atoms which are in their elemental form last (O_2 , H_2 , Cu, P_4 etc.)
5. Include the symbols and formulas of all the elements and compounds that are used as reactants and formed as products
6. Balance the metals first, polyatomic ions second, nonmetals except oxygen and hydrogen, then oxygen and hydrogen are balanced last