8.2 - Reduction / Oxidation Rxn

Red Ox

★ Transfer of electrons ★

- Assign oxidation number to each atom in a reaction to track the transfer of electron.

Rules

- All pure substances = Ø
- monoatomic ions = charge
- ★ molecules the oxidation #'s within a molecule or polyatomic ion must equal Ø
- Polyatomic ion the ox #'s must = charge
  - oxygen ox # 2-
  - hydrogen ox # 1+

(ex) $Cl_{2(g)} = \emptyset$ $Cl^{1-} = 1-$

$CO_{2(g)}$ $O = 2-$ $C = 4+$

$X + 2(2-) = \emptyset$ neutral

SO_4^{2-} $O = 2-$ $S = 6+$

$X + 4(2-) = 2-$

$8- = 2-$ Charge of the ion

Example:

Who	What	How
~~What~~ Who are atoms ~~are~~ involved in Red Ox	What # of electrons are transfred	How are the electrons transfered using ½ reaction
* iron *	* oxygen *	* rust *

$Fe_{(s)} + O_{2(g)} \rightarrow Fe^{2+}O^{2-}{}_{(s)}$

Fe: lost 2e⁻ = oxidized

O_2: gain 2e⁻ = reduced

LEO says GER

- LEO: Loss of electrons, Oxidation, Reducing Agent
- GER: Gain of electrons, Reduced, Oxidizing Agent

½ oxidation Rxn: $2(2Fe \rightarrow 2e^- + 2Fe^{2+})$

+

½ Reduction Rxn: $O_2 + 4e^- \rightarrow 2O^{2-}$

transfer

Total: $2Fe + O_2 \rightarrow 2Fe^{2+} + 2O^{2-}$

Who Red Ox ~~What #~~ ~~How~~ Ys Trans

#1

Ox #'s $1Sn_{(s)} + 2Ag^{+}_{(aq)} \rightarrow 1Sn^{2+}_{(aq)} + 2Ag_{(s)}$

0 → 2+ (Sn) ; 1+ → 0 (Ag)

Lost 2e⁻ = Oxidation
Reducing Agent

Gain 1e⁻ = Reduced
Oxidizing Agent

½ Rxn Reduction $(2Ag^{1+} + \underbrace{2e^-}_{\text{Gain } e^-} \rightarrow 2Ag) \times 2$

½ Rxn Oxidation $Sn \rightarrow \underbrace{2e^-}_{\text{lost } e^-} + Sn^{2+}$

$2Ag^{1+} + 2e^- + 1Sn \rightarrow 2Ag + 2e^- + 1Sn^{2+}$

cancel out electrons

Total # of electrons transferred = (2e⁻)