

## Redox - Chapter 21

### I. Redox Basics

#### A. Redox Reactions

1. Redox stands for
2. Redox reactions involve a
3. (single replacement, combustion, synthesis, decomposition)

#### B. Terminology

1. : when all bonds are **assumed** to be ionic (not shared).
2.
  - a. . Charge (oxidation #) Ex:
  - b. . Charge (oxidation #) Ex:
3. You can write reactions out as
  - a. This shows what is happening to the reactants independently.
  - b.
4. Agents (these are )
  - a.
  - b.
5. Example:  $\text{Cu}_{(s)} + \text{Ag}^+_{(aq)} \rightarrow \text{Cu}^{2+}_{(aq)} + \text{Ag}_{(s)}$

#### C. How do you determine whether reduction or oxidation is happening?

- 1.
2. How to determine oxidation numbers:

Substance	Oxidation Number

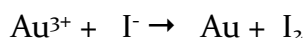
#### 3. NOTES!

- a. If there are the two “unknown” oxidation states, the
  - b. Metals with known ionic charges are going to have an oxidation state that is the
4. Examples: Find the ox # of each element in the following:  
 $\text{HNO}_3$   
 $\text{CO}_2$   
 $\text{SO}_3^{2-}$   
 $\text{NO}_2^-$

D. How to balance Redox Reactions

1. Oxidation States Method - Steps:

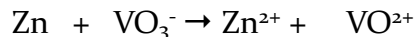
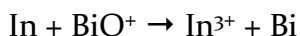
- a. Find the oxidation number of all substances.
- b. Link the elements that have changed oxidation state.
- c. Balance the elements that you have linked
- d. Determine if the linked elements have oxidized or reduced.
- e. List the TOTAL number of electrons lost or gained (if 2 of an element is present, multiply number of electrons by 2)
- f. Make the number of electrons equal for both reactions by multiplying. Use the multiplier as the coefficient for BOTH linked substances.
- g. Then balance the rest of the reaction (leave the H's for last and O's for second to last)



2. Acidic and Basic solutions

a. Acidic solutions are

- i. Balance the equation using the oxidation states method.
- ii. After you have balanced the equation:
  - a.
  - b.



b. Basic solutions are full of

- i. Balance the reaction as if it were an acidic solution,
  - a. Then, add
  - b. If necessary,