

Test 2 Equations that you need to memorize

Chapter 4

Strong Acids

| Name | Formula | Ions |
|-------------------|-------------------------|---|
| Hydrochloric acid | HCl | $\text{H}^+(\text{aq}) + \text{Cl}^-(\text{aq})$ |
| Hydrobromic acid | HBr | $\text{H}^+(\text{aq}) + \text{Br}^-(\text{aq})$ |
| Hydroiodic acid | HI | $\text{H}^+(\text{aq}) + \text{I}^-(\text{aq})$ |
| Nitric acid | HNO_3 | $\text{H}^+(\text{aq}) + \text{NO}_3^-(\text{aq})$ |
| Perchloric acid | HClO_4 | $\text{H}^+(\text{aq}) + \text{ClO}_4^-(\text{aq})$ |
| Chloric Acid | HClO_3 | $\text{H}^+(\text{aq}) + \text{ClO}_3^-(\text{aq})$ |
| Sulfuric acid | H_2SO_4 | $\text{H}^+(\text{aq}) + \text{HSO}_4^-(\text{aq})$ |

Strong Bases

| Name | Formula | Ions |
|---------------------|--------------------------|--|
| Lithium hydroxide | LiOH | $\text{Li}^+(\text{aq}) + \text{OH}^-(\text{aq})$ |
| Sodium hydroxide | NaOH | $\text{Na}^+(\text{aq}) + \text{OH}^-(\text{aq})$ |
| Potassium hydroxide | KOH | $\text{K}^+(\text{aq}) + \text{OH}^-(\text{aq})$ |
| Rubidium hydroxide | RbOH | $\text{Rb}^+(\text{aq}) + \text{OH}^-(\text{aq})$ |
| Cesium hydroxide | CsOH | $\text{Cs}^+(\text{aq}) + \text{OH}^-(\text{aq})$ |
| Calcium hydroxide | $\text{Ca}(\text{OH})_2$ | $\text{Ca}^{2+}(\text{aq}) + 2 \text{OH}^-(\text{aq})$ |
| Strontium hydroxide | $\text{Sr}(\text{OH})_2$ | $\text{Sr}^{2+}(\text{aq}) + 2 \text{OH}^-(\text{aq})$ |
| Barium hydroxide | $\text{Ba}(\text{OH})_2$ | $\text{Ba}^{2+}(\text{aq}) + 2 \text{OH}^-(\text{aq})$ |

Solubility Rules

| Soluble Ions | Exceptions |
|---|---|
| $\text{Li}^+, \text{Na}^+, \text{K}^+, \text{Rb}^+, \text{Cs}^+, \text{NH}_4^+$ | None |
| $\text{C}_2\text{H}_3\text{O}_2^-, \text{NO}_3^-, \text{ClO}_3^-, \text{ClO}_4^-$ | None |
| $\text{Cl}^-, \text{Br}^-, \text{I}^-$ | $\text{Ag}^+, \text{Pb}^{2+}$ |
| SO_4^{2-} | $\text{Ag}^+, \text{Pb}^{2+}, \text{Ca}^{2+}, \text{Sr}^{2+}, \text{Ba}^{2+}$ |

Rules for assigning oxidation numbers

1. The sum of oxidation state for all atoms in a molecule or polyatomic ion equals the charge of the molecule or ion (indicated as a superscript)
2. The oxidation state of an atom in an elemental substance is zero
3. The oxidation state of a monatomic ion is equal to the ion's charge
4. Group 1 metals and silver have +1 oxidation states. Group 2 atoms and zinc have +2 oxidation states. Aluminum has a +3 oxidation state.
5. Hydrogen is +1 when combined with nonmetals and -1 when combined with metals
6. Oxygen is -2 in most compounds but is occasionally -1 in peroxides, O_2^{2-} .
7. Other atoms follow the previously discussed common charges

$$\text{Percent Yield} = \frac{\text{Actual Yield}}{\text{Theoretical Yield}} \times 100$$