



Chemical Reactions Ws #6: Classifying Reactions

Directions: Write a balanced equation and indicate the reaction type for each equations.

SR = single replacement DR = double replacement

C = Combination D = Decomposition

- DR 1. Aluminum nitrate solution reacts with sodium hydroxide solution to yield sodium nitrate solution and a precipitate of aluminum hydroxide

$$\text{Al}(\text{NO}_3)_3 (\text{aq}) + 3 \text{NaOH} (\text{aq}) \rightarrow 3 \text{NaNO}_3 (\text{aq}) + \text{Al}(\text{OH})_3 (\text{s})$$
- D 2. Solid potassium chlorate is heated to yield solid potassium chloride and oxygen gas.

$$2\text{KClO}_3 (\text{s}) \rightarrow 2\text{KCl} (\text{s}) + 3 \text{O}_2 (\text{g})$$
- DR 3. A solution of phosphoric acid reacts with magnesium hydroxide solution to give a precipitate of magnesium phosphate and liquid water.

$$2\text{H}_3\text{PO}_4 (\text{aq}) + 3 \text{Mg}(\text{OH})_2 (\text{aq}) \rightarrow \text{Mg}_3(\text{PO}_4)_2 (\text{s}) + 6 \text{H}_2\text{O} (\text{l})$$
- D 4. In the presence of heat, ammonium nitrite solid will yield nitrogen gas and liquid water.

$$\text{NH}_4\text{NO}_2 (\text{s}) \rightarrow \text{N}_2 (\text{g}) + 2 \text{H}_2\text{O} (\text{l})$$
- *Redox 5. Ammonia gas reacts with oxygen gas to give nitrogen monoxide gas and water gas.

$$4\text{NH}_3 (\text{g}) + \text{O}_2 (\text{g}) \rightarrow 4 \text{NO} (\text{g}) + 6 \text{H}_2\text{O} (\text{l})$$
- DR 6. Aqueous barium chloride reacts with aqueous sodium sulfate to give sodium chloride solution and a precipitate of barium sulfate.

$$\text{BaCl}_2 (\text{aq}) + \text{Na}_2\text{SO}_4 (\text{aq}) \rightarrow 2 \text{NaCl} (\text{aq}) + \text{BaSO}_4 (\text{s})$$
- DR 7. A solution of iron III bromide reacts with aqueous ammonium sulfide to give solid iron III sulfide and aqueous ammonium bromide.

$$2\text{FeBr}_3 (\text{aq}) + 3 (\text{NH}_4)_2\text{S} (\text{aq}) \rightarrow \text{Fe}_2\text{S}_3 (\text{s}) + 6\text{NH}_4\text{Br} (\text{aq})$$
- C 8. Solid calcium oxide combines with solid diphosphorus pentoxide to produce solid calcium phosphate

$$3 \text{CaO} (\text{s}) + \text{P}_2\text{O}_5 (\text{s}) \rightarrow \text{Ca}_3(\text{PO}_4)_2 (\text{s})$$
- DR 9. An aqueous solution of magnesium chloride combines with an aqueous solution of silver nitrate to produce aqueous magnesium nitrate and solid silver chloride.

$$\text{MgCl}_2 (\text{aq}) + 2 \text{AgNO}_3 (\text{aq}) \rightarrow \text{Mg}(\text{NO}_3)_2 (\text{aq}) + 2 \text{AgCl} (\text{s})$$
- DR 10. Solid aluminum hydroxide and acetic acid solution combine to produce aqueous aluminum acetate and liquid water.

$$\text{Al}(\text{OH})_3 (\text{s}) + 3\text{HC}_2\text{H}_3\text{O}_2 (\text{aq}) \rightarrow \text{Al}(\text{C}_2\text{H}_3\text{O}_2)_3 (\text{aq}) + 3\text{H}_2\text{O} (\text{l})$$
- SR 11. Solid iron reacts with solid silver acetate to yield iron II acetate solution plus beautiful solid silver.

$$\text{Fe} (\text{s}) + 2 \text{AgC}_2\text{H}_3\text{O}_2 (\text{s}) \rightarrow \text{Fe}(\text{C}_2\text{H}_3\text{O}_2)_2 (\text{aq}) + 2\text{Ag} (\text{s})$$
- DR 12. Calcium hydroxide solution reacts with phosphoric acid to yield the salt precipitate calcium phosphate and water.

$$3\text{Ca}(\text{OH})_2 (\text{aq}) + 2\text{H}_3\text{PO}_4 (\text{aq}) \rightarrow \text{Ca}_3(\text{PO}_4)_2 (\text{s}) + 6 \text{H}_2\text{O} (\text{l})$$
- DR 13. Sodium hydroxide solution reacts with sulfuric acid to give the soluble salt sodium sulfate and water

$$2\text{NaOH} (\text{aq}) + \text{H}_2\text{SO}_4 (\text{aq}) \rightarrow \text{Na}_2\text{SO}_4 (\text{s}) + 2 \text{H}_2\text{O} (\text{l})$$
- DR 14. Magnesium nitrate (aq) + sulfuric acid (aq) → magnesium sulfate (aq) + nitric acid (aq)

$$\text{Mg}(\text{NO}_3)_2 (\text{aq}) + \text{H}_2\text{SO}_4 (\text{aq}) \rightarrow \text{MgSO}_4 (\text{aq}) + 2 \text{HNO}_3 (\text{aq})$$
- DR 15. Cadmium III phosphate (aq) + Ammonium sulfide (aq) → cadmium III sulfide (aq) + ammonium phosphate (aq)

$$2\text{CdPO}_4 (\text{aq}) + 3(\text{NH}_4)_2\text{S} (\text{aq}) \rightarrow \text{Cd}_2\text{S}_3 (\text{aq}) + 2 (\text{NH}_4)_3\text{PO}_4 (\text{aq})$$

