Worksheet 5

1. Write a balanced equation using coefficients and subscripts based on the substances indicated.

2. Indicate the type of chemical reaction in the left margin (S, D, SR, DR)

3. Include oxidation numbers for all elements.

1. Sulfur + Oxygen 🡪 Sulfur Dioxide (g)

Syn

2. Zinc + Sulfuric Acid 🡪 Zinc Sulfate (aq) + Hydrogen (g)

3. Hydrogen + Nitrogen 🡪 Ammonia (g)

4. Hydrogen + Chlorine 🡪 Hydrogen Chloride (g)

5. Carbon + Water (g) 🡪 Carbon Monoxide (g) + Hydrogen (g)

6. Calcium Oxide + Water 🡪 Calcium Hydroxide (aq)

7. Barium Chloride + Sulfuric Acid 🡪 Barium Sulfate (s) + Hydrochloric Acid

8. Hydrochloric Acid + Sodium Hydroxide 🡪 Sodium Chloride (aq) + Water

9. Aluminum Sulfate + Calcium Hydroxide 🡪 Aluminum Hydroxide + Calcium Sulfate

10. Copper + Chlorine 🡪 CopperII Chloride

11. Aluminum Oxide 🡪 Aluminum + Oxygen

Write the balanced equation, ionic equation, net ionic equation and list the spectator ions:

Aluminum Bromide + Silver I Nitrate 🡪

Worksheet 5 Answer Key

1. Sulfur + Oxygen 🡪 Sulfur Dioxide (g)

Syn

**S0 O20 (g) S+4O2-2 (g)**

2. Zinc + Sulfuric Acid 🡪 Zinc Sulfate (aq) + Hydrogen (g)

**Zn0 H2+(S+6O4-2)-2(aq) Zn+2(S+6O4-2)-2(aq) H20 (g)**

**SR**

3. Hydrogen + Nitrogen 🡪 Ammonia (g)

**3 H20 (g) N20 (g) 2 N+3H3-1 (g)**

Syn

4. Hydrogen + Chlorine 🡪 Hydrogen Chloride (g)

Syn

**H20 (g) Cl20 (g) 2 H+Cl-1 (g)**

5. Carbon + Water (g) 🡪 Carbon Monoxide (g) + Hydrogen (g)

**SR**

**C0(s)** **H2+1O-2(g)C+2O-2(g)H20 (g)**

6. Calcium Oxide + Water 🡪 Calcium Hydroxide (aq)

**Ca+2O-2(s)H2+1O-2 Ca+2(O-2H+1)2-1(aq)**

Syn

7. Barium Chloride + Sulfuric Acid 🡪 Barium Sulfate (s) + Hydrochloric Acid

**Ba+2Cl2-1(aq)H2+(S+6O4-2)-2(aq)** Ba**+2(S+6O4-2)-2 (s) 2 H+Cl-1 (aq)**

DR

8. Hydrochloric Acid + Sodium Hydroxide 🡪 Sodium Chloride (aq) + Water

**H+Cl-1 (aq) Na+1(O-2H+1)-1(aq) Na+1Cl-1(aq) H2+1O-2**

DR

9. Aluminum Sulfate + Calcium Hydroxide 🡪 Aluminum Hydroxide + Calcium Sulfate

**Al2+3(S+6O4-2)3-2(aq) 3 Ca+2(O-2H+1)2-1(aq) 2 Al+3(O-2H+1)3-1 3 Ca+2(S+6O4-2)-2**

DR

10. Copper + Chlorine 🡪 CopperII Chloride

Syn

**Cu0 Cl20 Cu+2Cl2-1**

11. Aluminum Oxide 🡪 Aluminum + Oxygen

2 **Al2+3O3-2(s) 4 Al0(s) 3 O20 (g)**

D

Write the balanced equation, ionic equation, net ionic equation and list the spectator ions:

Aluminum Bromide + Silver I Nitrate 🡪 Aluminum Nitrate + Silver I Bromide

**Al+3Br3-1(aq) 3 Ag+1(N+5O3-2) -1(aq)Al+3(N+5O3-2)3 -1(aq)3 Ag+1Br-1 ↓ or (s)**

**Al+3(aq)+ 3 Br-1(aq) + 3 Ag+1(aq)+3 (N+5O3-2) -1(aq) 🡪 Al+3(aq) +3 (N+5O3-2)-1(aq)+3Ag+1 Br-1 ↓**

Net Ionic Equation: **3 Br-1(aq) + 3 Ag+1(aq)🡪 3Ag+1 Br-1 (s)**

Spectator Ions: **Al+3**, **(N+5O3-2) -1**

Equation Worksheet 6

1. Write a balanced equation using coefficients and subscripts based on the substances indicated.

2. Indicate the type of chemical reaction in the left margin (S, D, SR, DR)

3. Include oxidation numbers for all elements.

1. Barium Chloride + Sodium Sulfate 🡪 Barium Sulfate + Sodium Chloride

DR

2. Calcium + Oxygen (g) 🡪 Calcium Oxide

3. Copper II Carbonate 🡪 Copper II Oxide + Carbon Dioxide

4. Aluminum + Hydrochloric Acid 🡪 Aluminum Chloride + Hydrogen

5. Potassium Iodide + Chlorine 🡪 Potassium Chloride + Iodine

6. Barium Hydroxide + Sulfuric Acid 🡪 Barium Sulfate + Water

7. Copper + Silver I Nitrate 🡪 CopperII Nitrate + Silver

8. Zinc Sulfate + Ammonium Sulfide 🡪 Zinc Sulfide + Ammonium Sulfate

9. Sodium + Water 🡪 Sodium Hydroxide + Hydrogen

10. Mercury II Oxide 🡪 Mercury + Oxygen

11. Magnesium + Nitrogen 🡪 Magnesium Nitride

Write the balanced equation, ionic equation, net ionic equation and list the spectator ions:

Sodium Carbonate + ZincII Chloride 🡪 ZincII Carbonate + Sodium Chloride

Net Ionic Equation:

Spectator Ions:

Equation Worksheet 6 Answer Key

1. Write a balanced equation using coefficients and subscripts based on the substances indicated.

2. Indicate the type of chemical reaction in the left margin (S, D, SR, DR)

3. Include oxidation numbers for all elements.

1. Barium Chloride + Sodium Sulfate 🡪 Barium Sulfate + Sodium Chloride

DR

**Ba+2Cl2-1(aq) Na2+1(S+6O4-2)-2(aq) Ba+2(S+6O4-2)-2 (s) 2 Na+1 Cl-1(aq)**

2. Calcium + Oxygen (g) 🡪 Calcium Oxide

Syn

**2 Ca0 O20 (g) 2 Ca+2O-2**

3. Copper II Carbonate 🡪 Copper II Oxide + Carbon Dioxide

D

**Cu+2(C+4O3-2)-2(s) Cu+2O-2 (s) C+4O2-2 (g)**

4. Aluminum + Hydrochloric Acid 🡪 Aluminum Chloride + Hydrogen

SR

2 **Al0(s) 6 H+1Cl-1(aq) 2 Al+3Cl3-1(s) 3 H20(g)**

5. Potassium Iodide + Chlorine 🡪 Potassium Chloride + Iodine

SR

**2 K+1I-1(aq) Cl20(g)2 K+1Cl-1(aq) I20 (g)**

6. Barium Hydroxide + Sulfuric Acid 🡪 Barium Sulfate + Water

DR

**Ba+2(O-2H+1)2-1(aq) H2+1(S+6O4-2)-2(aq) Ba+2(S+6O4-2)-2 (s) 2 H2+1O-2**

7. Copper + Silver I Nitrate 🡪 CopperII Nitrate + Silver

SR

**Cu0 (s) 2 Ag+1(N+5O3-2)-1(aq)Cu+2(N+5O3-2)2-1(aq) 2 Ag0(s)**

8. Zinc Sulfate + Ammonium Sulfide 🡪 Zinc Sulfide + Ammonium Sulfate

DR

**Zn+2(S+6O4-2)-2(aq) (N-3H4+1)2+1S-2(aq)Zn+2S-2 (s)(N-3H4+1)2+1(S+6O4-2)-2(aq)**

9. Sodium + Water 🡪 Sodium Hydroxide + Hydrogen

SR

2 **Na0(s) 2 H2+1O-2 2 Na+1(O-2H+1)-1(aq) H20 (g)**

10. Mercury II Oxide 🡪 Mercury + Oxygen

D

**2 Hg+2O-2 (s) 2 Hg0(s)O20 (g)**

11. Magnesium + Nitrogen 🡪 Magnesium Nitride

D

**3 Mg0(s) N20 (g) Mg3+2N2-3(aq)**

Write the balanced equation, ionic equation, net ionic equation and list the spectator ions:

Sodium Carbonate + ZincII Chloride 🡪 ZincII Carbonate + Sodium Chloride

**Na2+1(C+4O3-2)-2(aq) Zn+2Cl2-1(aq) Zn+2(C+4O3-2)-2 (s) 2 Na+1Cl-1(aq)**

**2 Na+1(aq)+ (C+4O3-2)-2(aq) + Zn+2(aq)+2 Cl-1(aq) 🡪 Zn+2(C+4O3-2)-2↓ +2 Na+1(aq)+ 2 Cl-1(aq)**

Net Ionic Equation: **Zn+2(aq)+ (C+4O3-2)-2(aq) 🡪 Zn+2(C+4O3-2)-2 ↓**

Spectator Ions: **Na+1**,**Cl-1**

Worksheet 7

Assume Complete Combustion

Propane C3H8

Pentane C5H12

Hexane C6H14(g)

Octane C8H18

Worksheet 7

Answers

Assume Complete Combustion

Propane

**C3H8 + 5O2 → 3CO2 + 4H2O + Heat.**

Pentane

**C5H12 + 8O2 → 5CO2 + 6H2O**

Hexane

**2C6H14(g) + 19O2(g) → 12CO2(g) + 14H2O(g)**

Octane

**2C8H18 + 25O2 🡪 16CO2 + 18H2O**