Name _____
Teacher _____
Class _____ Block ___
Date _____

Word Equations Worksheet

What is Solid?

Write the balanced chemical equations for each of the following chemical reactions. ~~If there is a solid formed in a double replacement reaction, give the **complete ionic equation** and the **net ionic equation.**~~

1) When dissolved beryllium chloride reacts with dissolved silver nitrate in water, aqueous beryllium nitrate and silver chloride powder are made.

Be^{2+} Cl^- Ag^+ NO_3^-

$BeCl_2 + 2AgNO_3 \rightarrow 2AgCl(s) + Be(NO_3)_2(aq)$

2) When isopropanol (C_3H_8O) burns in oxygen, carbon dioxide, water, and heat are produced.

$2C_3H_8O + 10O_2 \rightarrow 6CO_2 + 8H_2O$

3) When dissolved sodium hydroxide reacts with sulfuric acid (H_2SO_4), aqueous sodium sulfate, water, and heat are formed.

$2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

4) When fluorine gas is put into contact with calcium metal at high temperatures, calcium fluoride powder is created in an exothermic reaction.

$F_2 + Ca \rightarrow CaF_2(s)$

5) When sodium metal reacts with iron (II) chloride, iron metal and sodium chloride are formed.

$2Na + FeCl_2 \rightarrow Fe(s) + 2NaCl$

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Word Equations Stoichiometry Worksheet

~~Write the balanced chemical equations for each of the following chemical reactions. If there is a solid formed in a double replacement reaction, give the **complete ionic equation** and the **net ionic equation.**~~

1) What is the theoretical yield if you have 1.5 g of both reactants? 2s.f.

$1.5\text{g } BeCl_2 \times \frac{1\text{ mol } BeCl_2}{79.912\text{g } BeCl_2} \times \frac{2\text{ mol AgCl}}{1\text{ mol } BeCl_2} \times \frac{143.35\text{g AgCl}}{1\text{ mol AgCl}} = 5.38 = 5.4\text{g AgCl}$ smallest

$1.5\text{g } AgNO_3 \times \frac{1\text{ mol } AgNO_3}{169.91\text{g } AgNO_3} \times \frac{2\text{ mol AgCl}}{2\text{ mol } AgNO_3} \times \frac{143.35\text{g AgCl}}{1\text{ mol AgCl}} = 1.27 = \boxed{1.3\text{g AgCl}}$

Be 9.012, Cl 2(35.45) → 79.912g
Ag 107.9, N 14.01, O 3(16) → 169.91g
Ag 107.9, Cl 35.45 → 143.35g

2) How many grams of water are produced if you have excess oxygen and 3.7 g of isopropanol? 2s.f.

$3.7\text{g } C_3H_8O \times \frac{1\text{ mol } C_3H_8O}{60.11\text{g } C_3H_8O} \times \frac{8\text{ mol } H_2O}{2\text{ mol } C_3H_8O} \times \frac{18.02\text{ g } H_2O}{1\text{ mol } H_2O} = 4.436 = 4.4\text{g } H_2O$

C 3(12.01), H 8(1.01), O (16.0) → 60.11g
H 2(1.01), O 16 → 18.02g

3) What is limiting if you have 1.25 g of each reactant? H_2SO_4

Compare reactants

$1.25\text{g } NaOH \times \frac{1\text{ mol } NaOH}{40.01\text{g } NaOH} \times \frac{1\text{ mol } H_2SO_4}{2\text{ mol } NaOH} \times \frac{98.12\text{ g } H_2SO_4}{1\text{ mol } H_2SO_4} = \boxed{1.53\text{g } H_2SO_4}$ limiting

23.0 + 16 + 1.01 = 40.01 g NaOH
2(1.01) + 32.1 + 4(16) = 98.12 g H_2SO_4

Compare products

$1.25\text{g } NaOH \times \frac{1\text{ mol } NaOH}{40.01\text{g } NaOH} \times \frac{2\text{ mol } H_2O}{2\text{ mol } NaOH} \times \frac{18.02\text{g } H_2O}{1\text{ mol } H_2O} = 0.563\text{g } H_2O$

$1.25\text{g } H_2SO_4$ limiting $\times \frac{1\text{ mol } H_2SO_4}{98.12\text{g } H_2SO_4} \times \frac{2\text{ mol } H_2O}{1\text{ mol } H_2SO_4} \times \frac{18.02\text{g } H_2O}{1\text{ mol } H_2O} = \boxed{0.459\text{g } H_2O}$

4) How many grams of calcium fluoride are produced with 7.9 g of fluorine? What is the actual mass if you have 103% yield? How can you get more than 100%?

$7.9\text{g } F_2 \times \frac{1\text{ mol } F_2}{38\text{g } F_2} \times \frac{1\text{ mol } CaF_2}{1\text{ mol } F_2} \times \frac{78.08\text{g } CaF_2}{1\text{ mol } CaF_2} = 16.23\text{g } CaF_2$ Contamination

19 × 2
40.08 + 38

$\frac{A}{T} \times 100 = \%$ $\frac{A}{16.23\text{g}} \times 100 = 103\%$ $\frac{A}{16.23\text{g}} = 1.03$ $A = 16.7 = \boxed{17\text{g } CaF_2}$

5) What mass of iron is produced from 2.0 g of sodium? What is the actual mass if you have 94.5% yield? Why is it less than 100%?

$2.0\text{g Na} \times \frac{1\text{ mol Na}}{22.99\text{g Na}} \times \frac{1\text{ mol Fe}}{2\text{ mol Na}} \times \frac{55.847\text{g Fe}}{1\text{ mol Fe}} = 2.429\text{g Fe}$ Spill, lost materials

$\frac{A}{T} \times 100 = 94.5\%$ $\frac{A}{2.429\text{g}} \times 100 = 94.5\%$ $\frac{A}{2.429\text{g}} = 0.945$ $\boxed{A = 2.3\text{g Fe}}$