

Some Stoichiometry Problems!!!!

1. When aluminum reacts with ferric oxide a lot of energy is released. What mass of aluminum must be used to create 15. grams of iron.

7.2 grams

2. Aluminum may react with ammonium perchlorate to produce aluminum oxide, aluminum chloride, nitrogen monoxide and water. What mass of ammonium perchlorate must be used to react with one kilogram of Al?

4350 grams

3. Barium hydroxide octahydrate will react with ammonium thiocyanate in an endothermic manner. What mass of ammonium thiocyanate must be used to completely react with 6.5 grams of barium hydroxide octahydrate?

3.14 grams (remember that the octahydrate affects the formula mass by adding 8 water molecules)

4. Sulfuric acid is reacted with some compound to produce phosphoric acid and calcium sulfate in a double replacement reaction. What mass of concentrated sulfuric acid (98 % by mass) must be used to react completely with 100 grams of the unknown compound?

96.8 grams (100 per sig figs)

5. Coke is an impure form of carbon that is often used in the industrial production of metals from their oxides. If a sample of coke is 95% by mass, determine the mass of coke needed to react completely with 1.0 ton of copper (II) oxide.

79.4 kg. Assume a ton is 1000 kg.

6. Alka-Seltzer uses the reaction of sodium hydrogen carbonate with citric acid in an aqueous environment to produce a fizz. Citric acid is $\text{HC}_6\text{H}_7\text{O}_7$. What mass of citric acid should be used for every 100 mg of baking soda? What mass of gas could be produced from such a mixture?

.229 grams (.2 per sig figs)

7. Aspirin is synthesized by reacting 2 hydroxybenzoic acid ($\text{C}_7\text{H}_6\text{O}_3$) with acetic anhydride ($\text{C}_4\text{H}_6\text{O}_3$). The products are $\text{C}_9\text{H}_8\text{O}_4$ and acetic acid. What mass of acetic anhydride is needed to completely consume 100.0 grams of 2 hydroxybenzoic acid? What is the maximum mass of aspirin that could be produced in this reaction?

73.9 grams

130.4 grams

8. In acidic solution, copper (II) hydroxide + HPO_3^{2-} yields copper (I) oxide and a phosphate ion
What mass of copper (II) hydroxide will be necessary to produce 100.0 grams of phosphate ion?

9. In a basic solution, dinitrogen monoxide + hypochlorite ion yields a chloride ion and a nitrite ion.
If 50.0 grams of dinitrogen monoxide are mixed with 50.0 grams of sodium hypochlorite, what mass of chloride ion will be produced?