

KEY

Percent, Actual, and Theoretical Yield

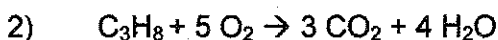


a) I began this reaction with 20 grams of lithium hydroxide. What is my theoretical yield of lithium chloride?

$$\frac{20\text{g LiOH}}{23.95\text{g LiOH}} \times \frac{1\text{mol LiOH}}{1\text{mol LiOH}} \times \frac{1\text{mol LiCl}}{1\text{mol LiOH}} \times 42.39\text{g LiCl} = \boxed{35.40\text{g LiCl}}$$

b) I actually produced 6 grams of lithium chloride. What is my percent yield?

$$\frac{6\text{g LiCl}}{35.40\text{g LiCl}} \times 100 = \boxed{16.9\%}$$



a) If I start with 5 grams of C_3H_8 , what is my theoretical yield of water?

$$\frac{5\text{g C}_3\text{H}_8}{44.11\text{g C}_3\text{H}_8} \times \frac{1\text{mol C}_3\text{H}_8}{1\text{mol C}_3\text{H}_8} \times \frac{4\text{mol H}_2\text{O}}{1\text{mol C}_3\text{H}_8} \times 18.02\text{g H}_2\text{O} = \boxed{8.17\text{g H}_2\text{O}}$$

b) I got a percent yield of 75%. How many grams of water did I make?

$$(8.17\text{g H}_2\text{O})(.75) = \boxed{6.13\text{g H}_2\text{O}}$$



My theoretical yield of beryllium chloride was 10.7 grams. If my actual yield was 4.5 grams, what was my percent yield?

$$\% \text{yield} = \frac{4.5\text{g}}{10.7\text{g}} \times 100 = \boxed{42\%}$$



What is my theoretical yield of sodium oxide if I start with 20 grams of calcium oxide?

$$\frac{20\text{g CaO}}{56.08\text{g CaO}} \times \frac{1\text{mol CaO}}{1\text{mol CaO}} \times \frac{1\text{mol Na}_2\text{O}}{1\text{mol CaO}} \times 61.98\text{g Na}_2\text{O} = \boxed{22.10\text{g Na}_2\text{O}}$$

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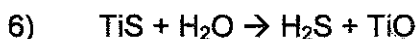
a) What is my theoretical yield of iron (II) chloride if I start with 34 grams of iron (II) bromide?

$$\frac{34 \text{ g FeBr}_2}{215.65 \text{ g FeBr}_2} \times \frac{1 \text{ mol FeBr}_2}{1 \text{ mol FeBr}_2} \times \frac{126.75 \text{ g FeCl}_2}{1 \text{ mol FeCl}_2} = 19.98 \text{ g FeCl}_2$$

19.98 g FeCl₂

b) What is my percent yield of iron (II) chloride if my actual yield is 4 grams?

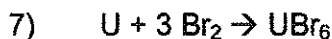
$$\frac{4 \text{ g FeCl}_2}{19.98 \text{ g FeCl}_2} \times 100 = 20\%$$



What is my percent yield of titanium (II) oxide if I start with 20 grams of titanium (II) sulfide and my actual yield of titanium (II) oxide is 22 grams?

$$\frac{20 \text{ g TiS}}{79.95 \text{ g TiS}} \times \frac{1 \text{ mol TiS}}{1 \text{ mol TiS}} \times \frac{63.88 \text{ g TiO}}{1 \text{ mol TiO}} = 15.98 \text{ g TiO}$$

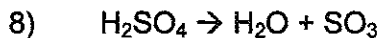
$$\frac{22 \text{ g TiO}}{15.98 \text{ g TiO}} \times 100 = 137.7\% \Rightarrow \text{Not Possible}$$



What is my actual yield of uranium hexabromide if I start with 100 grams of uranium and get a percent yield of 83%?

$$\frac{100 \text{ g U}}{238.03 \text{ g U}} \times \frac{1 \text{ mol U}}{1 \text{ mol U}} \times \frac{717.43 \text{ g UBr}_6}{1 \text{ mol UBr}_6} = 301.4 \text{ g UBr}_6$$

$$(301.4 \text{ g UBr}_6)(.83) = 250.16 \text{ g UBr}_6$$



If I start with 89 grams of sulfuric acid and produce 7.1 grams of water, what is my percent yield?

$$\frac{89 \text{ g H}_2\text{SO}_4}{98.09 \text{ g H}_2\text{SO}_4} \times \frac{1 \text{ mol H}_2\text{SO}_4}{1 \text{ mol H}_2\text{SO}_4} \times \frac{18.02 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 16.35 \text{ g H}_2\text{O}$$

$$\frac{7.1 \text{ g H}_2\text{O}}{16.35 \text{ g H}_2\text{O}} \times 100 = 43.4\%$$