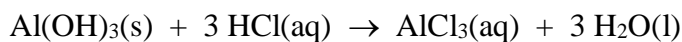


HC Stoichiometry, Limiting Reactant & % Yield

S U P P L E M E N T A L P R A C T I C E P R O B L E M S

General Stoichiometry

1. Several brands of antacid tablets use aluminum hydroxide to neutralize excess acid.



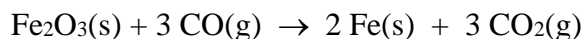
[Molar masses: 78.01 36.46 133.4 18.02]

If 0.750 g of Al(OH)_3 is completely reacted:

a) What mass of $\text{HCl}(\text{aq})$ is required?

b) What mass of water is produced?

2. The equation for one of the reactions in the process of reducing iron ore to the metal is



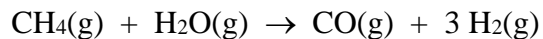
[Molar masses: 159.7 28.01 55.85 44.01]

a) What is the maximum mass of iron, in grams, that can be obtained from 454 g of iron(III) oxide?

b) What volume of $\text{CO}_2(\text{g})$ can be produced when 454 g of iron(III) oxide react completely?

Limiting Reactants

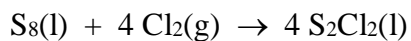
3. The reaction of methane and water is one way to prepare hydrogen:



[Molar masses: 16.04 18.02 28.01 2.02]

If you begin with 995 g of CH_4 and 2510 g of water, what is the maximum mass of H_2 that can be produced?

4. Disulfur dichloride, S_2Cl_2 , is used to vulcanize rubber. It can be made by treating molten sulfur with gaseous chlorine:

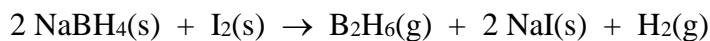


[Molar masses: 256.6 70.91 135.0]

Starting with a mixture of 32.0 g of sulfur and 71.0 g of Cl_2 , which is the limiting reactant? What is the maximum mass of S_2Cl_2 that can be produced?

Percent Yield

29. Diborane, B_2H_6 , is a valuable compound in the synthesis of new organic compounds. One of several ways this boron compound can be made is by the reaction



[Molar masses: 37.84 253.8 27.67 149.9 2.02]

Suppose you use 1.203 g of NaBH_4 with an excess of iodine and obtain 0.295 g of B_2H_6 . What is the percent yield of B_2H_6 ?

31. Disulfur dichloride, which has a revolting smell, can be prepared by directly combining S_8 and Cl_2 , but it can also be made by the following reaction:



[Molar masses: 103.0 41.99 108.1 135.0 58.46]

- a) Assume you begin with 5.23 g of SCl_2 and excess NaF . What is the theoretical yield of S_2Cl_2 ?

- b) If only 1.19 g of S_2Cl_2 is obtained, what is the percent yield of the compound?