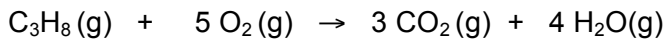
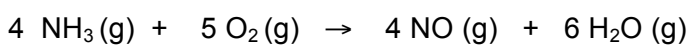
Stoichiometry
Worksheet #2

1. What mass of carbon dioxide is produced when 96.1 grams of propane is reacted with oxygen?



$$C_3H_8(g) + 5\,O_2(g) \rightarrow 3\,CO_2(g) + 4\,H_2O(g)$$

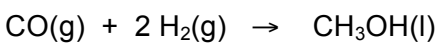
2. At high temperatures, ammonia gas, $NH_3(g)$, reacts with oxygen gas to form gaseous nitric oxide, NO(g), and water vapour. The balanced chemical equation for this reaction is



$$4\,NH_3(g) + 5\,O_2(g) \rightarrow 4\,NO(g) + 6\,H_2O(g)$$

A chemistry technician reacts 1.00 kg of NH_3 and obtains 1.40×10^3 g NO(g). Calculate the percent yield for this activity.

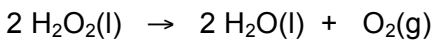
3. Methanol, also called methyl alcohol, can be manufactured by combination of carbon monoxide and hydrogen.



$$CO(g) + 2\,H_2(g) \rightarrow CH_3OH(l)$$

Suppose 8.60 kg $H_2(g)$ is reacted and 35.7 kg CH_3OH is actually produced. What is the percent yield of methanol?

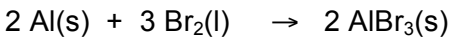
4. Hydrogen peroxide is sometimes used as an oxygen source for the treatment of municipal water.



$$2\,H_2O_2(l) \rightarrow 2\,H_2O(l) + O_2(g)$$

Calculate the mass of water and of oxygen that can be obtained from the complete decomposition of 7.30×10^4 g of hydrogen peroxide.

5. Aluminum reacts with bromine, producing aluminum bromide, as illustrated in the reaction below



$$2\,Al(s) + 3\,Br_2(l) \rightarrow 2\,AlBr_3(s)$$

In a certain experiment, 6.00 g aluminum reacted and 53.0 g aluminum bromide was obtained. Calculate the theoretical yield of $AlBr_3$ and the percent yield for this experiment.

Answers

1. 288 g
2. 80%
3. 52%
4. 3.44×10^4 g O_2 and 3.87×10^4 g H_2O
5. 59.3 g, 89.4%