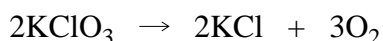


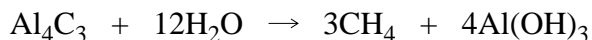
1. Oxygen can be made by heating  $\text{KClO}_3$ . The reaction is



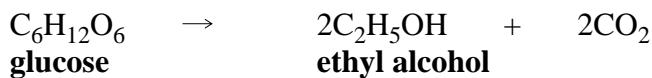
- (a) What mass of oxygen can be made from 3.00 g of  $\text{KClO}_3$ ?
- (b) What is the mass of  $\text{KCl}$  formed in the reaction in (a)?
- (c) What mass of  $\text{KClO}_3$  is needed to give 3.00 g of oxygen?
- (d) If 3.30 g of oxygen is obtained from 9.00 g of  $\text{KClO}_3$ , what is the percentage yield of oxygen?
2. How many grams of  $\text{CaO}$  will react with 23.8 g of  $\text{NH}_4\text{Cl}$  and how much  $\text{NH}_3$  will be formed? The reaction is



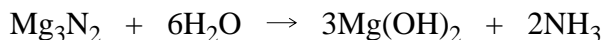
3. If  $\text{CH}_4$  is obtained in 93.5% yield from the reaction of  $\text{Al}_4\text{C}_3$  with water, what mass of  $\text{Al}_4\text{C}_3$  is required to yield 10.0 g of  $\text{CH}_4$ ? The reaction is



4. If ethyl alcohol is isolated in 88.0% yield from the fermentation of glucose, what volume of ethyl alcohol can be produced from 454 g (1 lb) of glucose? The density of ethyl alcohol is 0.789 g/mL. The reaction is

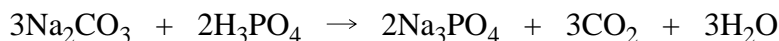


5. The reaction of magnesium nitride with water produces magnesium hydroxide and ammonia.

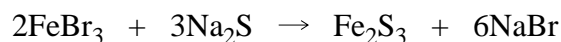


- (a) Calculate the mass of  $\text{NH}_3$  that can be made from 47.5 g of 86.0%  $\text{Mg}_3\text{N}_2$ .
- (b) Calculate the mass of 91.0%  $\text{Mg}_3\text{N}_2$  that is required to make 62.6 g of  $\text{NH}_3$ .
- (c) 31.0 g of a sample of  $\text{Mg}_3\text{N}_2$  gave 8.50 g of  $\text{NH}_3$ . What is the percent purity of the  $\text{Mg}_3\text{N}_2$  sample?

6. What mass of  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$  is needed to make 25.0 g of  $\text{Na}_3\text{PO}_4$  by the following reaction?

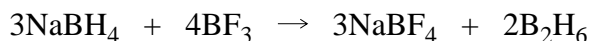


7. (a) How many grams of  $\text{Fe}_2\text{S}_3$  can be formed by the reaction of 3.50 g of  $\text{FeBr}_3$  and 6.40 g of  $\text{Na}_2\text{S}$ ? The reaction is:



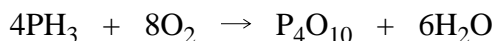
- (b) Calculate the mass of the excess reactant remaining at the end of the reaction.

8. Diborane,  $\text{B}_2\text{H}_6$ , is formed by the reaction shown below.



Calculate the theoretical yield of  $\text{B}_2\text{H}_6$  from the reaction of 1.30 g of  $\text{NaBH}_4$  and 2.50 g of  $\text{BF}_3$  and the mass of the excess reactant left over.

9. When 3.00 g of  $\text{PH}_3$  were reacted with 5.50 g of  $\text{O}_2$ , 5.60 g of  $\text{P}_4\text{O}_{10}$  were obtained. Calculate the percentage yield of  $\text{P}_4\text{O}_{10}$  in the reaction. The reaction is

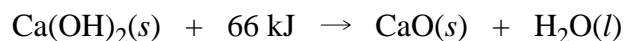


10. The combustion of propane ( $\text{C}_3\text{H}_8$ ) is given by the equation below.



- (a) Is the reaction **exothermic** or **endothermic**?
- (b) Calculate the heat change when 222 g of  $\text{C}_3\text{H}_8(g)$  is completely burned.
- (c) What mass of  $\text{CO}_2(g)$  is produced when the reaction produces a heat change of 456 J?

11. Calcium hydroxide can be decomposed as shown below.



- (a) Is the reaction **exothermic** or **endothermic**?
- (b) How many kilojoules of heat are required to decompose 454 g of  $\text{Ca}(\text{OH})_2(s)$ ?