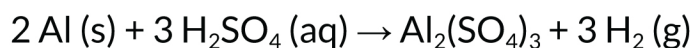


# ▶ STOICHIOMETRY ◀

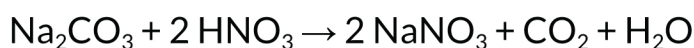
1. Aluminum will react with sulfuric acid in the following reaction.



a. How many moles of  $\text{H}_2\text{SO}_4$  will react with 18 mol of Al?

b. How many moles of each product will be produced?

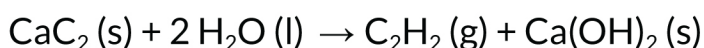
2. Sodium carbonate reacts with nitric acid according to the following equation.



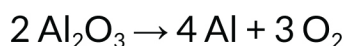
a. How many moles of  $\text{Na}_2\text{CO}_3$  are required to produce 100 g of  $\text{NaNO}_3$ ?

b. If 7.5 g of  $\text{Na}_2\text{CO}_3$  reacts, how many moles of  $\text{CO}_2$  are produced?

3. What mass of acetylene,  $\text{C}_2\text{H}_2$ , can be produced from the reaction of 90 g of calcium carbide,  $\text{CaC}_2$ , with water in the following reaction?



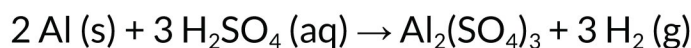
4. How many moles of aluminum will be produced from 30.0 g of  $\text{Al}_2\text{O}_3$  in the following reaction?



# ▶ STOICHIOMETRY ◀

## Answers

1. Aluminum will react with sulfuric acid in the following reaction.



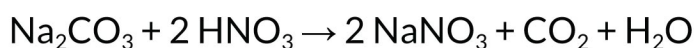
a. How many moles of  $\text{H}_2\text{SO}_4$  will react with 18 mol of Al?

$$18 \text{ mol Al} \times (3 \text{ mol H}_2\text{SO}_4 / 2 \text{ mol Al}) = 27 \text{ mol of H}_2\text{SO}_4$$

b. How many moles of each product will be produced?

$$9 \times 1 = 9 \text{ mol Al}_2(\text{SO}_4)_3 \text{ and } 9 \times 3 = 27 \text{ mol H}_2$$

2. Sodium carbonate reacts with nitric acid according to the following equation.



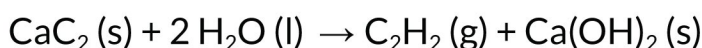
a. How many moles of  $\text{Na}_2\text{CO}_3$  are required to produce 100 g of  $\text{NaNO}_3$ ?

$$100 \text{ g NaNO}_3 \times (1 \text{ mol NaNO}_3 / 85 \text{ g NaNO}_3) \times (1 \text{ mol Na}_2\text{CO}_3 / 2 \text{ mol NaNO}_3) \\ = 0.588 \text{ mol Na}_2\text{CO}_3$$

b. If 7.5 g of  $\text{Na}_2\text{CO}_3$  reacts, how many moles of  $\text{CO}_2$  are produced?

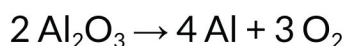
$$7.5 \text{ g Na}_2\text{CO}_3 \times (1 \text{ mol Na}_2\text{CO}_3 / 106 \text{ g Na}_2\text{CO}_3) \times (1 \text{ mol CO}_2 / 1 \text{ mol Na}_2\text{CO}_3) \\ = 0.071 \text{ mol CO}_2$$

3. What mass of acetylene,  $\text{C}_2\text{H}_2$ , can be produced from the reaction of 90 g of calcium carbide,  $\text{CaC}_2$ , with water in the following reaction?



$$90 \text{ g CaC}_2 \times (1 \text{ mol CaC}_2 / 64 \text{ g CaC}_2) \times (1 \text{ mol C}_2\text{H}_2 / 1 \text{ mol CaC}_2) \times (26 \text{ g C}_2\text{H}_2 / 1 \text{ mol C}_2\text{H}_2) \\ = 36.6 \text{ g C}_2\text{H}_2$$

4. How many moles of aluminum will be produced from 30.0 g of  $\text{Al}_2\text{O}_3$  in the following reaction?



$$30.0 \text{ g Al}_2\text{O}_3 \times (1 \text{ mol Al}_2\text{O}_3 / 101.96 \text{ g Al}_2\text{O}_3) \times (4 \text{ mol Al} / 2 \text{ mol Al}_2\text{O}_3) = 0.588 \text{ mol Al}$$