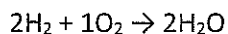


Name
Chemical Relationships



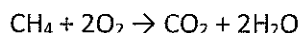
Determine the quantities produced or consumed. Show all work. Follow significant figures.

If 200.0 H₂ are consumed,

- How many O₂ are consumed?
- How many H₂O are consumed?

$$200 \text{ H}_2 \left| \frac{1 \text{ O}_2}{2 \text{ H}_2} = 100 \text{ O}_2$$

$$200 \text{ H}_2 \left| \frac{2 \text{ H}_2\text{O}}{2 \text{ H}_2} = 200 \text{ H}_2\text{O}$$

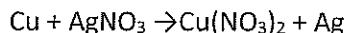


If a person is producing CO₂ at a rate of 2.50E5 molecules per second:

- What is the rate the O₂ is being consumed?
- What is the rate the water is being produced?

$$2.50 \text{ E}^5 \text{ CO}_2 \left| \frac{2 \text{ O}_2}{1 \text{ CO}_2} = 5.00 \text{ E}^5 \text{ O}_2$$

$$2.50 \text{ E}^5 \text{ CO}_2 \left| \frac{2 \text{ H}_2\text{O}}{1 \text{ CO}_2} = 5.00 \text{ E}^5 \text{ H}_2\text{O}$$



After a reaction has completed, 25,000 Ag atoms were produced,

- How many AgNO₃ units must have been present?
- How many Ag atoms can you extract from the answer from #5?

$$\textcircled{5} \quad 25,000 \text{ Ag} \left| \frac{1 \text{ AgNO}_3}{1 \text{ Ag}} = 25,000 \text{ AgNO}_3$$

$$\textcircled{6} \quad 25,000 \text{ AgNO}_3 \left| \frac{1 \text{ Ag}}{1 \text{ AgNO}_3} = 25,000 \text{ Ag}$$



Note: 6CO₂ have a mass of 264amu
 6 H₂O have a mass of 108 amu,
 1 C₆H₁₂O₆ has a mass of 180 amu
 O₂ = 32 amu,

$$1 \text{ O}_2 = 32 \text{ amu}$$

- If you have 250.0 CO₂ molecules, determine how many of every other reactant and product needed or produced.

$$250 \text{ CO}_2 \left| \frac{6 \text{ H}_2\text{O}}{6 \text{ CO}_2} = 250 \text{ H}_2\text{O} \quad 250 \text{ CO}_2 \left| \frac{1 \text{ C}_6\text{H}_{12}\text{O}_6}{6 \text{ CO}_2} = 42 \text{ C}_6\text{H}_{12}\text{O}_6$$

- With the given information, how much mass does 6 O₂ contain?

$$6 \text{ O}_2 \left| \frac{32 \text{ amu}}{1 \text{ O}_2} = 192 \text{ amu}$$

- What is the mass of 1 CO₂?

$$\textcircled{1} \quad 1 \text{ CO}_2 \left| \frac{264 \text{ amu}}{6 \text{ CO}_2} = 44 \text{ amu}$$

- What is the mass of 1 H₂O?

$$\left. \begin{array}{l} \rightarrow 1 \text{ H}_2\text{O} \left| \frac{108 \text{ amu}}{6 \text{ H}_2\text{O}} = 18 \text{ amu} \\ \rightarrow 1 \text{ H}_2\text{O} \left| \frac{12 \text{ amu}}{2 \text{ H}} = 6 \text{ amu} \end{array} \right\} \text{C}_6\text{H}_{12}\text{O}_6 \text{ have greater mass than } 2\text{H} = 0$$

$$\left. \begin{array}{l} \rightarrow \text{C} = 12 \text{ amu} \\ \rightarrow \text{H} = 1 \text{ amu} \\ \rightarrow \text{O} = 16 \text{ amu} \end{array} \right\}$$

(#5-2)

Chemical Ratios II

Answer the following questions relative to: $C_6H_{12}O_6$

1. If you have 1 $C_6H_{12}O_6$ how many Hydrogens are present? $1 \times 12 = 12 H$
2. If you have 10 $C_6H_{12}O_6$ how many hydrogens are present? $10 \times 12 = 120 H$
3. If you have 150 $C_6H_{12}O_6$ how many carbons are present? $150 \times 6 = 900 C$
4. If you have 500 H_2O molecules do you have more or less O then 100 $C_6H_{12}O_6$?

$$500 H_2O \begin{array}{r} / 10 \\ \hline 11 H_2O \end{array} = 500 O$$

$$100 C_6H_{12}O_6 \begin{array}{r} / 6 O \\ \hline 1 C_6H_{12}O_6 \end{array} = 600 O$$

Answer the following question relative to: $6 AgNO_3$ & $3(NH_4)_2O$

5. Which element is in equal quantities between the two substances? $6 N$
6. Which substance contains the most particles? $6 AgNO_3$

Answer the following questions relative to $AgNO_3$ ($Ag = 107 \text{ amu}$, $N = 14 \text{ amu}$, $O = 16 \text{ amu}$)

7. What is the total mass of O? $30 \begin{array}{r} / 16 \text{ amu} \\ \hline 1 O \end{array} = 48 \text{ amu}$
8. What is the total mass (amu) of 1 $AgNO_3$? $107 + 14 + 48 = 169 \text{ amu}$
9. How much mass of N is in 6 $AgNO_3$? $6 AgNO_3 \begin{array}{r} / 1 N \\ \hline 1 AgNO_3 \end{array} \begin{array}{r} / 14 \text{ amu} \\ \hline 1 N \end{array} = 84 \text{ amu}$
10. If a student has 200 amu of Ag, how much $AgNO_3$ can be made assuming rest of stuff is available.

$$200 \text{ amu Ag} \begin{array}{r} / 1 Ag \\ \hline 107 \text{ amu} \end{array} \begin{array}{r} / 1 Ag \\ \hline 1 Ag \end{array} \begin{array}{r} / 1 AgNO_3 \\ \hline 169 \text{ amu} \end{array} = 316 \text{ amu } AgNO_3$$