

## Conservation of Mass

### List

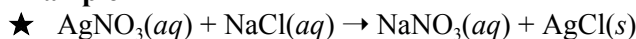
- describe what happens to the mass during a chemical change

### Notes

#### Matter is neither created nor destroyed

- ★ During a chemical reaction the mass does not change
- ★ The equation shows conservation of mass

#### Example

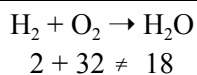


<u>SILVER NITRATE</u>		<u>SODIUM CHLORIDE</u>		<u>SODIUM NITRATE</u>		<u>SILVER CHLORIDE</u>	
<b>AgNO<sub>3</sub></b>		<b>NaCl</b>		<b>NaNO<sub>3</sub></b>		<b>AgCl</b>	
Ag =	1 × 108 = 108	Na =	1 × 23 = 23	Na =	1 × 23 = 23	Ag =	1 × 108 = 108
N =	1 × 14 = 14	Cl =	1 × 35 = 35	N =	1 × 14 = 14	Cl =	1 × 35 = 35
O =	3 × 16 = 48		58	O =	3 × 16 = 48		143
	170				85		
AgNO <sub>3</sub> (aq)	+	NaCl(aq)	→	NaNO <sub>3</sub> (aq)	+	AgCl(s)	
170	+	58	=	85	+	143	
		228		=		228	

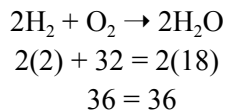
#### Balancing the equation to show conservation of mass

##### ★ Example

- ☆ The following equation does *not* show conservation of mass



- ☆ *but* starting with two molecules of hydrogen, as shown below by writing a **coefficient 2** in front of the hydrogen and forming two molecules of water as shown below by writing a **coefficient 2** in front of the water shows conservation



- ☆ Coefficients are used to **balance** equations
  - ☆ coefficients make the number of atoms of each type the same on the reactant and product side
  - ☆ coefficients make the mass the same on the reactant and product side of the equation

**Answer the questions below by circling the number of the correct response**

- If 46 g of **X** combines with 16 g of **Y** to form **Z**, how much **Z** is formed? (1) 30 g (2) 2.9 g (3) 724 g (4) 62 g
- The formula mass of sulfuric acid ( $\text{H}_2\text{SO}_4$ ) is (1) 194 amu, (2) 98 amu, (3) 50 amu, (4) 192 amu
- Which of the following equations does *NOT* show conservation of mass? (1)  $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$  (2)  $\text{Mg} + \text{S} \rightarrow \text{MgS}$  (3)  $\text{H}_2 + \text{S} \rightarrow \text{H}_2\text{S}$  (4)  $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$
- If 6 g of hydrogen burns to produce 54 g of water, how much oxygen was used? (1) 48 g (2) 60 g (3) 9 g (4) 324 g
- During a chemical change, the total mass (1) increases, (2) decreases, (3) remains the same.
- Which of the following is *NOT* a balanced equation?  
(1)  $\text{Cu} + 2\text{AgNO}_3 \rightarrow 2\text{Ag} + \text{Cu}(\text{NO}_3)_2$   
(2)  $3\text{BaCl}_2 + \text{Fe}_2(\text{SO}_4)_3 \rightarrow 2\text{FeCl}_3 + 3\text{BaSO}_4$   
(3)  $4\text{Na} + 2\text{H}_2\text{O} \rightarrow 4\text{NaOH} + \text{H}_2$   
(4)  $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$
- In the equation  $4\text{Al} + 3\text{O}_2 \rightarrow 2\text{Al}_2\text{O}_3$ , the number 4 is a (1) subscript, (2) oxidation state, (3) formula mass, (4) coefficient.
- When the equation  $\text{H}_2 + \text{N}_2 \rightarrow \text{NH}_3$  is completely balanced using smallest whole numbers, the sum of all the coefficients will be (1) 6 (2) 7 (3) 3 (4) 12
- When the equation  $\text{H}_2 + \text{Fe}_3\text{O}_4 \rightarrow \text{Fe} + \text{H}_2\text{O}$  is completely balanced using *smallest* whole numbers the coefficient of  $\text{H}_2$  would be (1) 1 (2) 2 (3) 3 (4) 4
- When the equation  $\text{C}_2\text{H}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$  is correctly balanced, using *smallest* whole-numbered coefficients, the sum of all the coefficients is (1) 16 (2) 12 (3) 8 (4) 4
- When the equation  $\text{NH}_3 + \text{O}_2 \rightarrow \text{HNO}_3 + \text{H}_2\text{O}$  is completely balanced using smallest whole numbers, the coefficient of  $\text{O}_2$  would be (1) 1 (2) 2 (3) 3 (4) 4
- When the equation  $\text{C}_2\text{H}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$  is balanced using smallest whole numbers, what is the coefficient of the  $\text{O}_2$ ? (1) 1 (2) 2 (3) 3 (4) 4

**Balance each of the equations below and write the *SUM* of the coefficients in the appropriate place on the answer sheet.**

- $\text{Al} + \text{HCl} \rightarrow \text{AlCl}_3 + \text{H}_2$
- $\text{Li} + \text{H}_2\text{O} \rightarrow \text{LiOH} + \text{H}_2$
- $\text{H}_2 + \text{N}_2 \rightarrow \text{NH}_3$
- When the equation  $\text{Na}(\text{s}) + \text{H}_2\text{O}(\ell) \rightarrow \text{NaOH}(\text{aq}) + \text{H}_2(\text{g})$  is correctly balanced using smallest whole numbers, the coefficient of the water is (1) 1 (2) 2 (3) 3 (4) 4
- When the equation  $\text{Al}(\text{s}) + \text{O}_2(\text{g}) \rightarrow \text{Al}_2\text{O}_3(\text{s})$  is correctly balanced using the smallest whole numbers, the coefficient of  $\text{Al}(\text{s})$  is (1) 1 (2) 2 (3) 3 (4) 4