

Write the following chemical equations and balance using coefficients.

1. Liquid mercury reacts with liquid bromine to produce solid mercury (II) Bromide



2. Solid calcium carbonate decomposes upon heating to produce solid calcium oxide and carbon dioxide gas.



3. Solid calcium will react with liquid water to produce aqueous calcium hydroxide and hydrogen gas.



4. Butane gas (C₄H₁₀) will react with oxygen gas to produce carbon dioxide gas and water vapor.



5. Solid aluminum will react with oxygen gas to produce solid aluminum oxide.



6. Aluminum metal is oxidized by oxygen (from the air) to form aluminum oxide.



7. Sodium oxide reacts with carbon dioxide to form sodium carbonate.



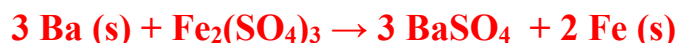
8. Calcium metal reacts with water to form calcium hydroxide and hydrogen gas.



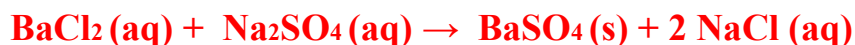
9. Potassium nitrate decomposes to form potassium nitrite and oxygen.



10. Barium metal reacts with Iron (III) sulfate to produce barium sulfate and iron metal.



11. Barium chloride reacts with sodium sulfate to produce barium sulfate and sodium chloride.

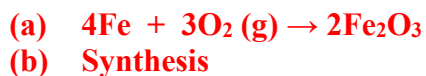


Types of Chemical Reactions

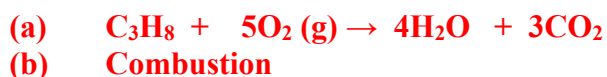
Directions

- (a) Write and balance the given equation.
- (b) Indicate the type of chemical reaction represented.

1. Iron reacts with oxygen gas to produce Iron (III) oxide.



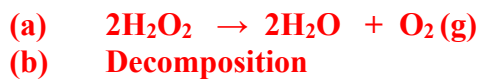
2. Propane (C_3H_8) reacts with oxygen gas to produce carbon dioxide and water.



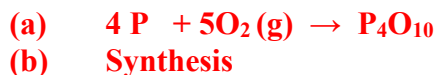
3. Bromine gas reacts with potassium iodide to produce potassium bromide and iodine gas.



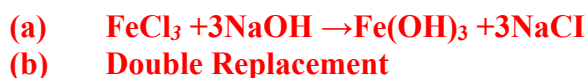
4. Hydrogen peroxide will produce water and oxygen gas if left in sunlight.



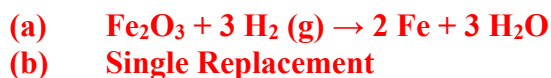
5. White Phosphorous reacts with oxygen gas to produce tetraphosphorous decoxide.



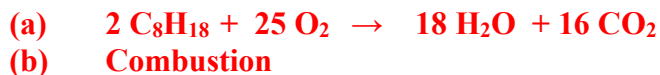
6. Iron (III) Chloride reacts with sodium hydroxide to produce Iron (III) hydroxide and sodium chloride.



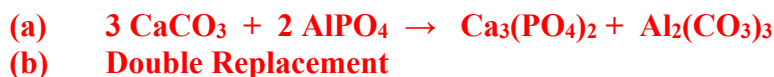
7. Iron (III) oxide reacts with hydrogen gas to produce iron and water.



8. Octane (C_8H_{18}) reacts with oxygen gas to produce carbon dioxide and water.



9. Calcium carbonate reacts with aluminum phosphate to produce calcium phosphate and aluminum carbonate.



10. Aluminum hydroxide decomposes to produce aluminum oxide and water.



(b) **Decomposition**

11. Zinc reacts with silver nitrate to produce zinc nitrate and silver.



(b) **Single Replacement**

12. Glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) reacts with oxygen gas to produce carbon dioxide and water.



(b) **Combustion**

13. Potassium oxide reacts with water to produce potassium hydroxide.



(b) **Synthesis**

14. Lead (IV) oxide decomposes into lead (II) oxide and oxygen gas.



(b) **Decomposition**

15. Hydrochloric acid (hydrogen chloride) reacts with barium hydroxide to produce water and barium chloride.



(b) **Double Replacement**

More Practice

Change the coefficients to make the number of atoms of each element equal on both sides of the equation

1. Calcium metal reacts with water to form solid calcium hydroxide and hydrogen gas.



2. Zinc hydroxide solution reacts with lithium to form lithium hydroxide solution and zinc metal.



3. Liquid propanol ($\text{C}_3\text{H}_7\text{OH}$) reacts with oxygen gas to form carbon dioxide gas and water vapor.



*note that $\text{C}_3\text{H}_7\text{OH}$ is a Liquid (l)

4. Aluminum metal reacts with oxygen gas to form solid aluminum oxide.



5. Liquid carbonic acid (hydrogen carbonate) decomposes into carbon dioxide gas and water.



6. Lead (II) nitrate solution reacts with iron (III) chloride solution to form solid lead (II) chloride and Iron (III) nitrate solution.



7. Aluminum metal reacts with silver sulfate solution to form aluminum sulfate solution and silver metal.



8. Methane gas (CH_4) reacts with oxygen gas to form carbon dioxide gas and water vapor.



9. Iron metal reacts with bromine gas to form iron (III) bromide solid.



10. Hydrogen peroxide solution decomposes into water and oxygen gas.



Rules for Predicting Products of Chemical Reactions

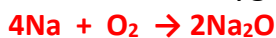
1. **Hydrocarbon + O₂** → CO₂ + H₂O (Combustion)
 - a. 2C₄H₁₀ + 13 O₂ → 8 CO₂ + 10 H₂O
2. Metal Carbonate → Metal Oxide + CO₂ (Decomposition)
 - a. MgCO₃ → MgO + CO₂
 - b. Synthesis: Metal Oxide + CO₂ → Metal Carbonate
3. Metal Sulfites → Metal Oxide + SO₂ (Decomposition)
 - a. CaSO₃ → CaO + SO₂
 - b. Synthesis: Metal Oxide + SO₂ → Metal Sulfite
4. Metal Hydride + H₂O → Metal Hydroxide + H₂ (Double Replacement)
 - a. KH + H₂O → KOH + H₂
5. Metal + H₂O → Metal Hydroxide + H₂ (Single Replacement)
 - a. 2Na + 2H₂O → 2NaOH + H₂
6. Metal Oxide + H₂O → Metal Hydroxide (Synthesis)
 - a. MgO + H₂O → Mg(OH)₂
7. Non-metal oxide + H₂O → ternary acid (Synthesis)
 - a. N₂O₃ + H₂O → 2 HNO₂
 - b. N₂O₅ + H₂O → 2 HNO₃
 - c. CO₂ + H₂O → H₂CO₃

Predicting Products: Write the COMPLETE balanced equation

1. Hydrochloric acid (HCl) reacts with sodium hydroxide.



2. Sodium reacts with oxygen



3. Mercury (II) oxide \rightarrow



4. Zinc reacts with lead (II) Nitrate



5. Silver nitrate reacts with calcium chloride



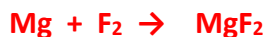
6. C_7H_{16} reacts with oxygen



7. CH_3OH reacts with oxygen



8. Magnesium reacts with Fluorine



9. Copper (II) Chloride \rightarrow



10. Aluminum reacts with Calcium Sulfide



11. Potassium Hydroxide reacts with Zinc Chloride



12. C_2H_2 reacts with oxygen



13. Sodium Iodide reacts with chlorine



14. Aluminum reacts with sulfur

