What do you think?

Mr. Gallant has two chemicals. What do you think will happen when he mixes them?

**PREDICT** what you think will happen in your notebook

- color change
- precipitate
- heat
- cold
- bubbles
- carbon dioxide
- light

**EXPLAIN** why you think that will happen

**OBSERVE** what does happen

**EXPLAIN** why you saw what you saw if it was different than your original prediction
Hydrogen Peroxide (11) + Phenyl Oxalate ester (1)

→ Carbon dioxide (g) + energy
1. zinc(s) + sulfur (s) + heat → zinc sulfide (s)
2. aluminum (s) + hydrogen chloride (g) → aluminum chloride (s) + hydrogen (g)
3. lithium (s) + oxygen (g) → lithium oxide (s)
4. magnesium (s) + carbon dioxide (g) → magnesium oxide (s) + carbon (s)
5. sodium (s) + chlorine (g) → sodium chloride (s)
6. hydrogen (g) + oxygen (g) + heat → water (g)
7. silver (s) + sulfur (s) → silver sulfide (s)
8. iron (s) + oxygen (g) → iron (III) oxide (s)
9. sodium (s) + water (l) → hydrogen (g) + sodium hydroxide (aq)
10. zinc (s) + hydrochloric acid (aq) → hydrogen (g) + zinc chloride (aq) + heat
Homework Solutions

Complete the following word equations

A) Aluminum resists corrosion because it reacts with a gas found in air to form a protective coating of aluminum oxide

\[
\text{aluminum(s)} + \text{oxygen(g)} \rightarrow \text{aluminum oxide(s)}
\]

B) Zinc metal, used as a coating on galvanized iron, also reacts with air to form a coating that resists further corrosion

\[
\text{zinc(s)} + \text{oxygen(g)} \rightarrow \text{zinc oxide(s)}
\]

C) When aluminum foil is placed in a solution of copper(II) chloride, copper metal and another solution are formed

\[
\text{aluminum(s)} + \text{copper(II) chloride(aq)} \rightarrow \text{copper (s)} + \text{aluminum chloride(aq)}
\]

D) When sodium sulfate and calcium chloride solutions are mixed, a precipitate of calcium sulfate and another substance is formed

\[
\text{sodium sulfate(aq)} + \text{calcium chloride(aq)} \rightarrow \text{calcium sulfate (s)} + \text{sodium chloride(s)}
\]
CO₂ and H₂O are produced in human cell respiration. The reactants are a sugar solution and an important gas that humans need to survive. Write a word equation for this reaction.

\[
glucone_{(s)} + oxygen_{(g)} \rightarrow carbon dioxide_{(g)} + water_{(l)}
\]
Summary hierarchy

- equation
  - word equations
    - chemical reaction
      - proper naming of chemicals
        - compounds
Feeling Hungry?

ham + bread +
Mayo + cheese +
tomato + lettuce +
bacon + onion +
pickles

→ ham sandwich
Analogy

Reactants

Products
Skeleton equations

Why might skeleton equations be more useful than word equations?

- Quicker, less space
- More understandable
- Lower language barrier
Skeleton equations

Instead of using words to represent chemical reactions, we can use the symbols for the elements and compounds directly.

Example

A solution of hydrochloric acid is mixed with solid sodium carbonate to form water, a solution of sodium chloride, and carbon dioxide gas.

Word Equation

\[ \text{hydrochloric acid} (aq) + \text{Sodium carbonate} (s) \rightarrow \text{Water} (l) + \text{Sodium chloride} (aq) + \text{Carbon dioxide} (g) \]

Skeleton equation

\[ \text{HCl} (aq) + \text{Na}_2\text{CO}_3 (s) \rightarrow \text{H}_2\text{O} (l) + \text{NaCl} (aq) + \text{CO}_2 (g) \]
1. zinc(s) + sulfur(s) + heat → zinc sulfide (s)

\[ \text{Zn(s)} + \text{S(s)} + \text{heat} \rightarrow \text{ZnS(s)} \]

2. aluminum(s) + hydrogen chloride(g) → aluminum chloride(s) + hydrogen(g)

\[ \text{Al(s)} + \text{HCl(g)} \rightarrow \text{AlCl}_3(s) + \text{H}_2(g) \]

3. lithium(s) + oxygen(g) → lithium oxide(s)

4. magnesium(s) + carbon dioxide(g) → magnesium oxide(s) + carbon(s)

5. sodium(s) + chlorine(g) → sodium chloride (s)
6. hydrogen(g) + oxygen(g) → heat → water (g)

7. silver(s) + sulfur(s) → silver sulfide (s)

8. iron(s) + oxygen(g) → iron (III) oxide (s)

9. sodium(s) + water (l) → hydrogen (g) + sodium hydroxide(aq)

10. zinc(s) + hydrochloric acid(aq) → hydrogen (g) + zinc chloride(aq) + heat
Homework Solutions with skeletons

A) Aluminum resists corrosion because it reacts with a gas found in air to form a protective coating of aluminum oxide

\[ \text{aluminum}(s) + \text{oxygen}(g) \rightarrow \text{aluminum oxide}(s) \]

B) Zinc metal, used as a coating on galvanized iron, also reacts with air to form a coating that resists further corrosion

\[ \text{zinc}(s) + \text{oxygen}(g) \rightarrow \text{zinc oxide}(s) \]
C) When aluminum foil is placed in a solution of copper(II) chloride, copper metal and another solution are formed

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\]
Homework

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Complete questions #2, #3 (assume all compounds are solids), #4b

Create a word equation for the production of your favourite type of pizza