

Reactions of Metals

Assignment – Student Edition

I. Reactions of Metals

Part A: Complete the summary chart for each of the general reactions of metals

1. Metal + Oxygen →

2. Metal + Water →

+

3. Metal + Acid →

+

Part B: Use the summary chart to answer the questions that follow.

1. Describe the changes you would observe when a metal like magnesium is combusted with oxygen.

2. Complete the word equation to show the reaction of magnesium with oxygen.

3. Describe the changes you would observe when a metal like sodium reacts with water.

4. Complete the word equation to show the reaction of sodium with water.

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5. Describe the changes you would observe when a metal like zinc reacts with hydrochloric acid.

6. Complete the word equation for the reaction between zinc metal and hydrochloric acid.

II. True or False?

Decide if the following statements are true or false. Correct the false statements to make them true.

1. All metals have similar reactions to air, water, and acids.
2. Rusting and combustion are examples of fast oxidation reactions.
3. Oxidation occurs when oxygen atoms combine with atoms of a different element.
4. When a metal reacts with water the product formed is alkaline.
5. Hydrogen gas is produced when a metal reacts with an acid.

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III. Fireworks

Read the information below on fireworks and use it to answer the questions which follow.

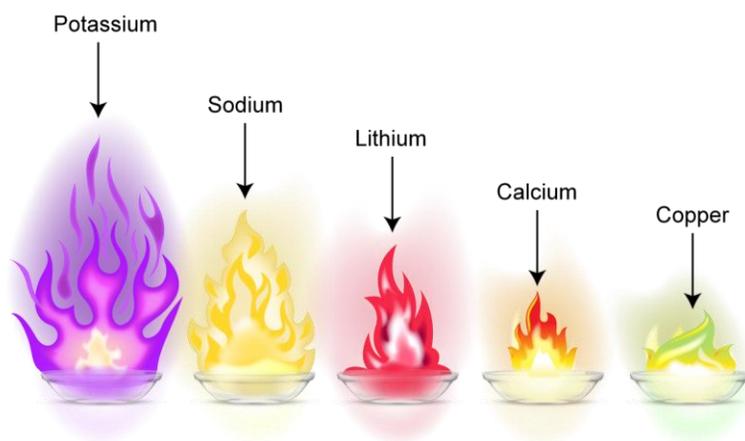


When a metal is burnt, it reacts with the oxygen in the air to produce a metal oxide. As the metal burns, a bright flame is produced, in an exothermic reaction. This is a reaction that gives out heat to its surroundings.

All fireworks contain two chemicals, an oxidizing agent, a chemical which is rich in oxygen atoms, such as potassium or strontium nitrate and a fuel which combines with the oxidizer to produce heat e.g., magnesium or aluminum powder. They also contain small metal filings which produce the bright range of colors.

The fuel oxidizes quickly, causing a great buildup in pressure that eventually leads to solids and gases bursting across the sky in colorful patterns. The fuel can be varied to alter the behavior and gives the different patterns seen in the sky.

By varying the type of metal filings added to the firework, different colored fireworks can be achieved. The image to the right shows some examples of the different metal filings used and the colors they emit.



Questions:

1. Fireworks are an example of a combustion reaction. Define the term combustion.

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2. The information describes fireworks as an example of an exothermic reaction. What does this mean?

3. Are fireworks an example of a chemical or physical change?

4. Give a reason for your answer to question 2.

5. Name the three reactants needed for fireworks and state their purpose in the reaction.

6. Are fireworks an example of slow or rapid oxidation? Give a reason for your answer.

7. What color would you expect lithium metal filings to give if they were added to fireworks?

8. To produce fireworks which are purple and green, which two metal compounds would you need to use?
