
# THE ALKALI METALS

Answer all the questions below then check your answers

1. Arrange the following alkali metals in order of increasing reactivity, most reactive metal first: caesium, sodium, potassium, lithium.

2. Explain the trend in reactivity of alkali metals as you go down Group 1.

3. Complete the word equation for the reaction of potassium with water:

potassium + water → _____ + _____

4. Write a balanced symbol equation for the reaction of lithium with water.

5. Describe the observations you would make during the reaction of sodium with water. The water has had a few drops of universal added to it before the sodium was added.

6. Explain why potassium reacts more vigorously with water than lithium. Answer:

7. True or False: Alkali metals react with oxygen to form oxides, peroxides and super oxides.

b. Write the balanced symbol equation for the reaction of sodium with oxygen to form sodium oxide

c. What other oxide is formed when sodium reacts with oxygen? Write a balanced symbolic equation for the formation of this oxide.

## Answers

1. Arrange the following alkali metals in order of increasing reactivity, most reactive metal first: caesium, sodium, potassium, lithium.

   Lithium, sodium, potassium, caesium

2. Explain the trend in reactivity of alkali metals as you go down Group 1.

   Atomic size increases – outer electron is further from the nucleus.
   Shielding increases – more inner electron shells weaken the attraction to the outer electron. The outer electron is more easily lost, making the element more reactive.

3. Complete the word equation for the reaction of potassium with water:

   potassium + water → _____ + _____

   potassium hydroxide + hydrogen

4. Write a balanced symbol equation for the reaction of lithium with water.

   $2Li_{(s)} + 2H_2O_{(l)} \rightarrow 2LiOH_{(aq)} + H_{2(g)}$

5. Describe the observations you would make during the reaction of sodium with water. The water has had a few drops of universal added to it before the sodium was added.

   Sodium floats and moves rapidly on the surface of the water.

   Fizzing/effervescence occurs as hydrogen gas is produced.

   The sodium melts into a silvery ball.

   The solution will turn purple with universal indicator, indicating an alkali.

6. Explain why potassium reacts more vigorously with water than lithium. Answer:

Potassium has a larger atomic radius than lithium.

Potassium's outer electron is further from the nucleus and experiences greater shielding, making it more easily lost.

Therefore, potassium reacts more readily with water, and the reaction is more vigorous.

7. True or False: Alkali metals react with oxygen to form oxides, peroxides and super oxides.

True

b. Write the balanced symbol equation for the reaction of sodium with oxygen to form sodium oxide

$4Na + O_2 \longrightarrow 2Na_2O$

c. What other oxide is formed when sodium reacts with oxygen? Write a balanced symbolic equation for the formation of this oxide.

Sodium

$2Na + O_2 \longrightarrow Na_2O_2$