



Chem!stry

Name: ()

Class:

Date: / /

Properties of the Group 1 Metals – the Alkali Metals

Question 1:

The Group 1 or Alkali metals are lithium (Li), sodium (.....), potassium (.....), rubidium (.....) and caesium (.....).

Question 2:

The table below lists the melting points, boiling points and densities of the Group 1 metals:

Group 1 Metal	Melting Point / °C	Boiling Point / °C	Density / g/cm ³
Lithium	180	1330	0.53
Sodium	97.8	890	0.97
Potassium	63.7	774	0.86
Rubidium	38.9	688	1.53
Caesium	28.7	690	1.90

Use the table above to help you answer the following questions:

a) Look at the densities of lithium, sodium and potassium. What would you expect to see when you add a small piece of lithium, sodium or potassium to a trough of water?

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b) Look at the melting point of caesium. What would you expect to see if you held a small piece of caesium in your hand?

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c) How do the physical properties of the Group 1 metals change while descending the Group?

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d) Comment on the strength of the metallic bond within the Group 1 metals. Would you expect the Group 1 metals to be hard or soft?

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e) Are the properties of the Group 1 metals typical of all metals? Briefly explain your answer:

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f) Which properties of the Group 1 metals would you expect to be the same as those of other metals?

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Question 3:

a) (*Practical demonstration or video*). Complete the table below to describe how the Group 1 metals react with cold water:

Metal	What do you observe during the reaction?	pH of solution (acid or alkali?)
Lithium		pH =
Sodium		pH =
Potassium		pH =

b) (*Optional activity*). Try to collect a test tube of the gas that is produced. Place a burning splint into the test tube. What do you observe? What is the identity of the gas that was collected?

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c) Use your observations to arrange the Group 1 metals in order of reactivity:

Least reactive:

.....

Most reactive:

d) What is the trend or pattern in the reactivity of the Group 1 metals?

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e) What would you expect to see when the Group 1 metals *rubidium* and *caesium* are added to a trough of cold water?

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Question 4:

Write a word equation and a balanced chemical equation, including state symbols, for the reaction between each Group 1 metal and water:

a) The reaction between *lithium* and water:

Word equation: lithium + water → +

Balanced chemical equation:

b) The reaction between *sodium* and water:

Word equation: sodium + water → +

Balanced chemical equation:

c) The reaction between *potassium* and water:

Word equation: potassium + water → +

Balanced chemical equation:

Question 5:

Predict the formulae of rubidium chloride, caesium sulfate, rubidium nitrate and caesium carbonate. Would you expect these salts to be soluble or insoluble in water?

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