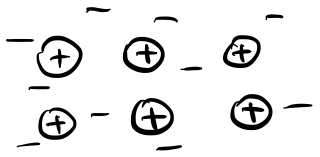
GCSE Chemistry A (Gateway Science)

J248/01 Chemistry A C1-C3 and C7 (Foundation Tier)

Question Set 31

1 Lithium is a metal found in Group 1 of the Periodic Table.



(a) (i) Describe the structure and bonding in a metal.

You may include a diagram in your answer.

Metal ions (cations) arranged in a regular lattice structure within the sea of delocalised electrons

[2]

(ii) Lithium is **malleable** even though metallic bonds are strong.

Explain why metals are malleable.

Because the layers of metal ions can easily slide over each other when a force is applied. (without breaking the metallic bonds)

[1]

(iii) Lithium can conduct electricity in the solid and liquid state.

Explain why metals can conduct electricity.

Because metals have sea of delocalised electrons which can move and carry charge.

[2]

(b) An alloy is a mixture of a metal with one or more other elements.

When lithium is mixed with aluminium it makes an alloy that can be used in aircraft.

Adding different amounts of lithium to the aluminium changes the properties of the alloy.

Alloy	Percentage of lithium (%)	Density (g/cm^3)	Melting point (°C)	Strength (MPa)
A	2.00	2.58	670	550
B	2.20	2.56	580	555
C	2.45	2.55	655	565

A scientist thinks that alloy **C** is best for making an aircraft.

Is she correct?

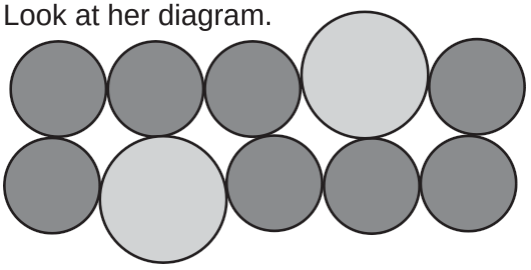
Explain your answer using evidence from the table.

[2]

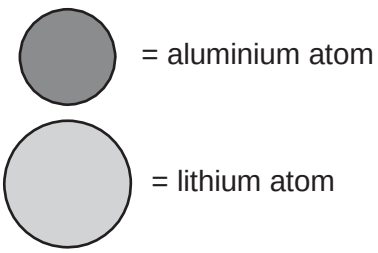
Yes because alloy C has the lowest density and the highest strength

(c) The scientist uses the particle model to show the elements present in alloy **B**.

Look at her diagram.



Alloy **B**



not to scale

(i) Calculate the **percentage of lithium atoms** in the diagram of alloy **B**.

$\frac{2}{10} \times 100 = 20\%$

Percentage of lithium atoms = 20 % **[1]**

(ii) Use your answer to part **(c)(i)** to explain if the diagram accurately shows the structure of alloy **B**.

No because alloy B has 2.20% of lithium not 20%. **[1]**

Total Marks for Question Set 31: 9