5.2 Purity

Exercise 5.2 Purity

Focus

In this exercise, you will explain what is meant by 'purity' and calculate the purity of silver.

1 What does a scientist mean by a 'pure element'?

.....

.....

2 Choose words from the list to complete the paragraph. Each word may be used once, more than once or not at all.

diamonds carbon atoms blue yellow green nickel hydrogen boron elements nitrogen compounds most common rarest coloured colourless

Diamonds are made of ..... atoms.

When diamonds are coloured they have ..... of different ..... mixed in with the carbon atoms.

When they have ..... atoms the diamonds will be a blue colour.

If diamonds have nitrogen atoms mixed with the carbon atoms the diamond will be a ..... colour.

The ..... colour of diamond is green. Green diamonds have nitrogen, ... or hydrogen mixed in with the carbon atoms.

3 A piece of silver marked 900 tells you that 900 parts out of 1000 of the piece are silver and the rest is made up of other elements. The percentage of silver is calculated as:

$$\frac{900}{1000} \times 100 = 90\%$$

Calculate the percentage of silver in a bracelet marked 925.

.....%

Practice

In this exercise, you will calculate the purity of gold.

Gold objects are usually marked in carats, to tell you how much gold they contain. A carat stands for one twenty-fourth. So you can work out exactly what percentage of the object is pure gold.

24 carat gold is $24 \times \frac{1}{24} = \frac{24}{24}$

It is twenty-four twenty-fourths gold, so it is pure gold.

To work out the percentage of gold:

$\frac{24}{24} \times 100 = 100\%$ gold

18 carat gold is $18 \times \frac{1}{24} = \frac{18}{24}$

It is $\frac{18}{24}$ gold. The remaining six parts are other metals; these are usually copper or silver.

To work out the percentage of gold:

$\frac{18}{24} \times 100 = 75\%$ gold

4 **a** Calculate the percentage of gold in 9 carat gold.
Give your answer correct to one decimal place.

.....%

b Calculate the percentage of gold in 22 carat gold.
Give your answer correct to one decimal place.

.....%

c Calculate the percentage of gold in 14 carat gold.
Give your answer correct to one decimal place.

.....%