CAIE Chemistry IGCSE

2.3 Isotopes

Flashcards

Define isotopes

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Isotopes are atoms of the same element that have the same number of protons and electrons but different number of neutrons

What is the mass number and proton number of this element: $^{12}_{6}C$

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- The top number indicates the mass number of carbon: 12 so carbon has 6 protons and 6 neutrons
- The bottom number indicates the proton number: 6 so carbon has 6 protons

What is the mass number and proton number of this ion: $^{35}_{17}Cl^-$

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- The bottom number indicates the proton number: 17
- The top number indicates the mass number: 35
- The minus charge shows an electron has been gained

Work out the number of protons, neutrons and electrons in $^{35}_{17}Cl^-$

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- The bottom number indicates the proton number: 17 so a chloride ion has 17 protons
- The top number indicates the mass number: 35 so the chloride ion has 17 protons and 18 neutrons
- The minus charge shows an electron has been gained, so the chloride ion has 18 electrons

Work out the number of protons, neutrons and electrons in $^{23}_{11}Na^{+}$

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- The bottom number indicates the proton number: 11 so a sodium ion has 11 protons
- The top number indicates the mass number: 23 so the sodium ion has 11 protons and 12 neutrons
- The plus charge shows an electron has been lost, so the sodium ion has 10 electrons

Why do isotopes of the same element have the same chemical properties (extended only)

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Isotopes of the same element will have the same chemical properties because the number of electrons stays the same, so the electron configuration stays unchanged

What is the relative atomic mass of an element (extended only)

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The relative atomic mass is an average value that takes account of the abundance of the isotopes of the element

Carbon has 2 isotopes:
Carbon-14 with abundance 20%
Carbon-12 with abundance 80%.
Calculate the relative atomic mass of carbon. (extended only)

Carbon has 2 isotopes: Carbon-14 with abundance 20% and Carbon-12 with abundance 80%. Calculate the relative atomic mass of carbon. (extended only)

$$\frac{(isotope\ 1\ mass \times abundance) + (isotope\ 2\ mass \times abundance)}{100}$$

For this question: ((14 x 20) + (12 x 80)) ÷ 100
= 1240 ÷ 100 = 12.4