WJEC Wales Physics GCSE

2.7 - Types of Radiation

Flashcards

What do all forms of the same element have in common?

What do all forms of the same element have in common?

The number of protons.

What is the name given to the number of protons in an atom?

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Atomic Number

What is an atom's mass number?

What is an atom's mass number?

The total number of protons and neutrons in the atom.

What is an isotope of an atom?

What is an isotope of an atom?

An atom of an element that has a different number of neutrons (so a different mass number), but the same number of protons.

Why are some atomic nuclei unstable?

Why are some atomic nuclei unstable?

- There is an imbalance between the numbers of protons and neutrons.
- They contain too much energy.

Why do unstable nuclei give out radiation?

Why do unstable nuclei give out radiation?

- Unstable nuclei undergo decay to become more stable.
- As they release radiation their stability increases.

What is the name of the process in which an unstable nucleus gives out radiation to become more stable?

What is the name of the process in which an unstable nucleus gives out radiation to become more stable?

Radioactive decay.

State four types of nuclear radiation.

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1. Alpha particles
2. Beta particles
3. Gamma rays
4. Neutrons

What are the constituents of an alpha particle?

What are the constituents of an alpha particle?

- Two protons and two neutrons
- It is the same as a helium nucleus

What is the range of an alpha particle through air?

What is the range of an alpha particle through air?

A few centimetres (normally in the range of 2-10cm).

What will stop beta radiation from passing through a point?

What will stop beta radiation from passing through a point?

- A thin sheet of aluminium
- Several metres of air

What will stop gamma radiation from passing through a point?

What will stop gamma radiation from passing through a point?

- Several centimetres of lead
- A few metres of concrete

Which type of radiation is most ionising?

Which type of radiation is most ionising?

Alpha radiation.

Which type of radiation is least ionising?

Which type of radiation is least ionising?

Gamma radiation.

Which type of radiation is least penetrating?

Which type of radiation is least penetrating?

Alpha radiation.

Which type of radiation is most penetrating?

Which type of radiation is most penetrating?

Gamma radiation.

State any changes to mass or charge that occur due to the emission of a gamma ray.

State any changes to mass or charge that occur due to the emission of a gamma ray.

Both mass and charge remain unchanged.

State any changes to mass or charge that occur due to the emission of a beta particle.

State any changes to mass or charge that occur due to the emission of a gamma ray.

Both mass remains unchanged, charge increases by 1.

State any changes to mass or charge that occur due to the emission of an alpha particle.

State any changes to mass or charge that occur due to the emission of a gamma ray.

Mass decreases by 4 and charge decreases by 2.

Describe the nature of radioactive decay.

Describe the nature of radioactive decay.

- Random
- Which nuclei decays and when is determined only by chance
- It is impossible to predict which nuclei will decay and when

State two techniques that can be used when carrying out experimental work, to combat the random nature of decay.

State two techniques that can be used when carrying out experimental work, to combat the random nature of decay.

1. Take repeat-readings
2. Carry the experiment out over a long period of time

Why is radioactive waste such a problem?

Why is radioactive waste such a problem?

- It remains radioactive for thousands of years.
- It can cause harm to living cells so must be stored appropriately.

Give 4 sources of background radiation.

Give 4 sources of background radiation.

1. Rocks
2. Cosmic rays from space
3. Nuclear weapon testing
4. Nuclear accidents