

OCR A Physics GCSE

6.2 - Uses and Hazards

Flashcards

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What is radioactive contamination?



What is radioactive contamination?

The presence of unwanted radioactive nuclei on other materials.



What is irradiation?



What is irradiation?

- The process of exposing a material to nuclear radiation.
 - The material does **not** become radioactive.



Give 3 practical applications of radioactive materials.



Give 3 practical applications of radioactive materials.

- Medical tracers
- Radiotherapy
- Smoke alarms



What kind of radiation is used in smoke alarms?



What kind of radiation is used in smoke detectors?

Alpha radiation



How do smoke alarms work?



How do smoke alarms work?

Alpha radiation is emitted into the air, reaching a detector and completing the circuit. If smoke is present, it blocks alpha radiation so it does not reach the detector and the circuit is broken, causing an alarm to sound.



Give a use of beta emitters.



Give a use of beta emitters.

Thickness monitoring of paper.



How does thickness monitoring work?



How does thickness monitoring work?

A source and receiver are placed on either side of the sheet. If there is a drop or rise in the number of particles detected, the thickness has changed and needs adjusting.



Why are isotopes with long half-lives particularly harmful?



Why are isotopes with long half-lives particularly harmful?

- They remain radioactive for much longer periods of time.
- They must be stored in specific ways to avoid humans and the environment from being exposed to radiation for too long.



State **two** uses of nuclear radiation in the field of medicine.



State **two** uses of nuclear radiation in the field of medicine.

1. Examining of internal organs.
2. Controlling and destroying unwanted tissue.



How is radiation used in sterilisation?



How is radiation used in sterilisation?

Gamma emitters are used to kill bacteria/parasites on equipment.



What kind of radiation is used for radiotherapy?



What kind of radiation is used for radiotherapy?

Gamma radiation.



Explain the process of radiotherapy.



Explain the process of chemotherapy

- Gamma emitters direct gamma rays onto specific areas with cancerous cells.
- The cells absorb the radiation and die.



What are the risks of ionising radiation to people?



What are the risks of ionising radiation to people?

It can damage living cells, causing them to die or mutate and become cancerous.



What is nuclear fusion?



What is nuclear fusion?

The joining of two light nuclei to produce a heavier nuclei and release energy.



Name two isotopes of hydrogen which are commonly used in nuclear fusion.



Name two isotopes of hydrogen which are commonly used in nuclear fusion.

Deuterium and Tritium



Which releases more energy, nuclear fission or nuclear fusion?



Which releases more energy, nuclear fission or nuclear fusion?

Nuclear fusion.



Explain the difficulty of generating energy through nuclear fusion.



Explain the difficulty of generating energy through nuclear fusion.

Fusion requires very high temperatures which in itself requires large quantities of energy and also requires casing which can withstand them.



What can mass be converted into?



What can mass be converted into?

Energy



What is nuclear fission?



What is nuclear fission?

The splitting of large, unstable nuclei to form smaller more stable nuclei (+the emission of spare neutrons).



What usually needs to happen to induce fission?



What usually needs to happen to induce fission?

- The unstable nuclei must absorb a neutron.
- Spontaneous fission (where no neutron absorption occurs) is rare.



Alongside two smaller nuclei, what else is emitted in a fission reaction?



Alongside two smaller nuclei, what else is emitted in a fission reaction?

- Two or three neutrons
- Gamma rays
- Energy



What takes place during a chain reaction
in a nuclear reactor?



What takes place during a chain reaction in a nuclear reactor?

- An unstable nucleus absorbs a neutron.
- The nucleus undergoes fission and releases 2 or 3 further neutrons.
- These induce more fission, which results in a chain reaction.

