CP6 Radioactivity

Electrons and Orbits

Describe what happens when an atom absorbs electromagnetic radiation

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Describe what happens when an atom emits electromagnetic radiation

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What is the difference between emission and absorption spectra

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How is Niels Bohr model of the atom different to Rutherfords?



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Lithium has an atomic number of 3 and loses an electron to form an ion. How many protons and electrons are there?

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Electrons and Orbits

Define an ion

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Describe how a magnesium atom becomes a magnesium ion

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Inside Atoms

Draw a labelled diagram of the modern day structure of an atom

|  |  |  |
| --- | --- | --- |
|  | Mass | Charge |
| Proton |  |  |
| Neutron |  |  |
| Electron |  |  |

Complete the table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | C | N | Mg | Ca |
| Mass number |  |  |  |  |
| Atomic number |  |  |  |  |
| Protons |  |  |  |  |
| Neutrons |  |  |  |  |
| Electrons |  |  |  |  |

Define an isotope

…………………………………………………………………………………………………………………………………………………………………………………….

Atomic Models

Draw a labelled diagram of the Plum Pudding Model

Draw a labelled diagram of Rutherford’s model

Describe the experiment Rutherford carried out which allowed him to come up with his model.

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What is the radius of a nucleus? ……………………………..

What is the radius of an atom? ………………………………..

How is Rutherford’s model of the atom similar to today’s model?

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Radioactive decay

Describe what happens during ß+ decay and the effect on the nucleus

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Describe what happens during ß- decay and the effect on the nucleus

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Complete the table summarising what happens to the mass and atomic number during radioactive decay

|  |  |  |
| --- | --- | --- |
|  | Mass number | Atomic number |
| Alpha |  |  |
| ß+ |  |  |
| ß- |  | Increases by 1 |

**Radium has a mass number of 226 and an atomic number of 88.**

Write a nuclear equation when this nucleus emits an alpha particle

Write a nuclear equation if Iodine-131 undergoes ß- decay.

Write a nuclear equation if Potassium-37 undergoes ß+ decay.

Radioactive decay

Complete the table

|  |  |
| --- | --- |
| Particle | Symbol |
| Alpha |  |  |
| Beta | ß- |  |
| Positron |  |  |
| Neutron |  | n |

What happens to the atomic and mass number when a neutron is emitted? ………………………………………. …………………………………………………………………………………………..…………………………………………………………………………………………..

Types of radiation

Describe the structure of a gamma ray

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What does unstable mean?

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|  |  |  |  |
| --- | --- | --- | --- |
|  | Alpha | Beta | Gamma |
| Ionising |  |  | Weak |
| Penetrating |  |  |  |
| Stopped by |  |  |  |

Explain why alpha particles are more ionising than beta particles

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Types of radiation

Describe the structure of an alpha particle

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What is the charge on an alpha particle? ……………….

Describe the structure of a beta particle

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What is the charge on a beta particle? …………………

Background Radiation

What is meant by background radiation?

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State 2 sources of **natural** background radiation:

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State 2 sources of background radiation that does not occur naturally

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How can radiation be measured and describe how the equipment works.

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Dangers of radioactivity

What happens to the intensity of radiation with increasing distance?

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Explain other precautions people should take when handling radioactive sources

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Explain how medical staff working with radioactive sources minimise exposure

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Describe the difference between contamination and irradiation

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Dangers of radioactivity

What are the dangers of exposure to ionising radiation?

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Half-life

Define half life

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What is the unit of activity of a radioactive substance? …………………………………………………………………….

Strontium has a half life of 29 years. How many half-lives is 58 years? ………………………………………………..

Calculate the half-life of both sources

Source A: ………………………………………………….

Source B: ………………………………………………….

