

OCR B Physics A Level

6.2.1 - Atomic Models

Flashcards



Prior to Rutherford's Alpha Scattering experiment, what was the widely accepted model of the atom?



Prior to Rutherford's Alpha Scattering experiment, what was the widely accepted model of the atom?

The Plum Pudding Model



What was the Plum Pudding model of the atom?



What was the Plum Pudding model of the atom?

The atom was described to be a sphere of positive charge, with small areas of negative charge distributed evenly throughout it.



Describe briefly how Rutherford carried out his alpha scattering experiment.



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Rutherford directed a stream of high speed alpha particles at a very thin sheet of gold foil and observed how these particles were affected by it.



What was the expected outcome of Rutherford's experiment?



What was the expected outcome of Rutherford's experiment?

Most of the alpha particles were expected to pass straight through the foil with very little deflection.



What was observed by Rutherford?



What was observed by Rutherford?

- Most particles passed through with no deflection.
- Some particles were deflected by large angles.
- A few particles were deflected by more than 90 degrees.



What conclusion can be drawn from the observation that most particles passed straight through?



What conclusion can be drawn from the observation that most particles passed straight through?

It can be concluded that most of the atom must be empty space.



What conclusion can be drawn from the observation that some particles were deflected by large angles?



What conclusion can be drawn from the observation that some particles were deflected by large angles?

It suggests that the centre of the atom must have a large positive charge which can repel these particles.



What conclusion can be drawn from the observation that some particles were deflected by more than 90 degrees?



What conclusion can be drawn from the observation that some particles were deflected by more than 90 degrees?

It suggests that the centre of the atom must be very small but also very dense since it changed the direction of fast-moving particles.



How is the composition of the atom described by the (currently) accepted model of the atom?



How is the composition of the atom described by the (currently) accepted model of the atom?

The atom is formed of a small, dense, positively charged nucleus containing protons and neutrons, surrounded by orbiting electrons arranged in discrete energy levels.



How can the distance of closest approach for a scattered alpha particle be calculated?



How can the distance of closest approach for a scattered alpha particle be calculated?

All of the particle's initial kinetic energy is converted into electrical potential energy so:

$$\frac{1}{2} mv^2 = \frac{kQq}{r}$$

Where r is the distance of closest approach

