

Student 5: Low Achieved

Note: This student evidence comes from student work related to the task FAQs. The following is a snippet of the complete report that was written by the student.

What conclusions were made about the atom from Rutherford's gold leaf experiment?

Rutherford fired a beam of alpha particles at thin gold foil. The alpha particles were from a radioactive source, in an evacuated container. A scintillation detector then rotated around the container was used to pick up the readings. Most of the particles passed straight through it with no deviation, a very small number were deflected. Conclusions were:

- nucleus charged because some atoms deflected.
- very few particles deflected through a very large angle – all mass in nucleus
- virtually all alpha particles went straight, as atoms are mainly empty space. [1]

What is radioactive decay?

Radioactive decay is the process where atomic nuclei instantly break up by releasing alpha, beta or gamma radiation. The two principles observed is the conservation of Mass number, and the conservation atomic number. The number of protons and neutrons remain the same for conservation of Mass number. The charge remains the same, for conservation atomic number. [2]

What are the products of nuclear reactions and what are their properties?

There are three possible products of nuclear reactions, these are alpha particles, beta particles and gamma radiation. Alpha particles are strong ionisers as they are heavy and slow, but can be stopped by a sheet of paper. Beta particles are less ionizing than alpha particles, but more penetrating as they're lighter. They can be stopped by metal foil. Gamma rays are the least ionizing, but travel quickly and are the most penetrating. Material that is dense such as lead is needed to stop them. [3]