Student 4: High 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.

How is Uranium used by power plants to make heat energy?

Uranium-235 can capture a neutron to form uranium-236. This uranium-236 is unstable and so will split into 2, to form 2 smaller nuclei, as well as 2 more neutrons. A possible reaction is:

$$^{235}_{92}U + {}^{1}_{0}n \rightarrow {}^{141}_{56}Ba + {}^{92}_{36}Kr + 3{}^{1}_{0}n + energy$$

Notice that the reaction makes three new neutrons. These neutrons are then captured by other atoms, thus starting a chain reaction.

Part of the energy produced during the reaction is heat [1] and this is used to boil water just like coal in in an ordinary power station. The steam drives the blades of a turbine which then drives a generator to produce electric power.

What is the difference between fission and fusion?

Fission is splitting a large nucleus into two or more smaller nuclei, whereas fusion is getting small nuclei and combining them together to form a big nucleus. Fission is started by firing a small particle like a neutron into the large nucleus, making it so unstable that it splits up. Fusion can only happen if the small nuclei are given huge amounts of energy to make them bash together at high speed. It is easier to cause fission than fusion. Both of these processes are governed by the fundamental laws of conservation of charge and mass. [2]

What are alpha particles used for?

Alpha particles are used in smoke detectors. They work by ionizing the air between two small plates which are part of an electric circuit. The ionised air is then used to pass a current between the plates. Smoke between the plates reduces the amount of air, thus reduces the amount of ionised air thus reducing the current passing through, making the smoke detector sound an alarm. [3]