



Fission and Fusion

Fission is a type of nuclear change that occurs when a very heavy nucleus splits into two smaller nuclei. Fusion occurs when small nuclei combine, or fuse, to form a larger, more stable nucleus.

When an atom of uranium-235 is bombarded with a neutron, several different fission reactions are possible. Write the balanced nuclear equation for each of the fission reactions. Each equation must be balanced for both mass and nuclear charge.

1. The uranium-235 nucleus breaks apart to form a cesium-144 nucleus and a rubidium-90 nucleus.

2. The uranium-235 nucleus undergoes fission to produce a bromine-87 nucleus and a lanthanum-146 nucleus.

3. Write the balanced equation for the nuclear reaction that occurs when a neon-21 nucleus is bombarded with an alpha particle (helium nucleus) and forms a magnesium-24 nucleus. Is this an example of a fission or fusion reaction? Explain your answer.

4. A fusion reaction that occurs in the sun involves the combination of two helium-3 nuclei. The products include two hydrogen nuclei and one other nucleus. Write the balanced nuclear equation for this reaction.

5. In addition to uranium-235, nuclear reactors also use plutonium-239 as a fuel. The first step in a series of fission reactions involving plutonium-239 is the release of an alpha particle (helium nucleus). Write the nuclear equation for this reaction.

6. Write the balanced nuclear equation for the fusion reaction between a lead-208 nucleus and an iron-58 nucleus. One of the two products is a neutron.
