

Marks
5

- How does the ratio of the number of neutrons to the number of protons in a stable or long-lived radionuclide change as the atomic number increases?

The generation of energy in a nuclear reactor is largely based on the fission of certain long-lived radionuclides (usually ^{235}U or ^{239}Pu). The fission products include every element from zinc through to the *f*-block. Explain why most of the radioactive fission products are β -emitters.

Two of the more common isotopes produced in nuclear reactors are ^{131}I (half-life of 8.02 days) and ^{137}Cs (half-life of 30 years). Both are β -emitters. If you were exposed to equal concentrations of both isotopes for 1 hour, which isotope, ^{137}Cs or ^{131}I , would do more damage? Explain your reasoning.