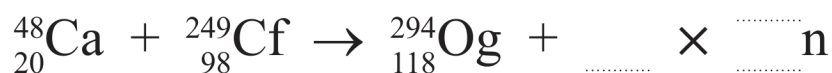


- 18 Oganesson (Og) can be produced by firing calcium (Ca) ions at a target of californium (Cf) atoms. Oganesson and a number of neutrons are produced in the nuclear reaction.

(a) Complete the equation for the reaction

(1)



(b) The calcium ions were accelerated to an energy of 245 MeV.

(i) State how ions of this energy could be produced.

(1)

(ii) It is claimed that calcium ions with an energy of 245 MeV are travelling at relativistic speeds.

Assess the validity of this claim.

mass of calcium ion = 47.95 u

(5)



(c) The isotope Og-294 is extremely unstable and decays via alpha decay.

After 2.5 ms, a sample contains 500 atoms of Og-294.

Calculate the original number of Og-294 atoms in the sample.

half-life of Og-294 = 0.89 ms

(3)

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Original number of atoms =

(d) Explain a precaution necessary when handling a sample of an alpha emitting isotope.

(2)

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