

- 8** Americium-241 is an artificially produced radioactive element that emits α -particles. A sample of americium-241 of mass $5.1 \mu\text{g}$ is found to have an activity of $5.9 \times 10^5 \text{ Bq}$.

(a) Determine, for this sample of americium-241,

(i) the number of nuclei,

number = [2]

(ii) the decay constant,

decay constant = s^{-1} [2]

(iii) the half-life, in years.

half-life = years [2]

(b) Another radioactive element has a half-life of approximately 4 hours.

Suggest why measurement of the mass and activity of a sample of this element is not appropriate for the determination of its half-life.

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..... [1]