



Nuclear Chemistry (2)

- 1 gm radium sample is disintegrated by 2.1 mg in 5 years. Then calculate $t_{1/2}$?
Ans. 1648 Years
- $t_{1/2}$ is equal to 100 years. Calculate t_{avg} .
Ans. 144 Years
- A radioactive sample disintegrated by 80% in 300 min. Calculate $t_{1/2}$.
Ans. 129.5 Min.
- The half-life of a radioactive nuclide is 20 years. If a sample of this nuclide has an activity of 6400 disintegrations per minute (dis/min) today, its activity (dis/min) after 100 years would be
Ans. 200
- Radioactive decay is a first order process. Radioactive carbon in wood sample decays with a half-life of 5770 yr. What is the rate constant (in yr^{-1}) for the decay? What fraction would remain after 11540 yr?
Ans. $1/4$
- Calculate the weight of ^{14}C having the activity equal to 3.7×10^7 dps. $t_{1/2}$ of ^{14}C is 5730 years.
- There are $0.618 \mu\text{g}$ of ^{206}Pb and $0.238 \mu\text{g}$ of ^{238}U in a rock. If $T_{1/2}$ of ^{238}U is 1.5×10^9 yr, age of the rock is
Ans. 3.0×10^9 yr
- In uranium mineral, the atomic ratio $N_{\text{U-238}}/N_{\text{Pb-206}}$ is nearly equal to one. The age (in yr) of the mineral is nearly (half-life period of U-238 is 4.5×10^9 yr)
Ans. 4.5×10^9
- A wood specimen containing ^{14}C taken from an ancient palace showed 24 counts in 3 minutes per gram of carbon in a detector. however, a fresh wood showed 52 counts in 2 minutes per gram of carbon. Assuming no background signal in the detector and half life of ^{14}C as 5730 years, the age (in years) of the wood specimen is
Ans. 9745.58 years