

51227, Physics, Other

Question Define the activity of a given radioactive substance. Calculate the activity of 1g sample of ^{90}Sr whose half life is 28 years. Express your answer in units of Curie (Ci).

Solution Let us find number of decays per second. How many atoms are there in 1 g of ^{90}Sr ?

$$N = N_A \frac{1g}{90} \approx 0.67 \cdot 10^{22}$$

How many will decay in 1 s:

$$N \cdot (1 - 2^{-\frac{1}{28 \cdot 31.6 \cdot 10^6}}) \approx 1.467 \cdot 10^{14}$$

If you want to convert it to curie:

$$\frac{1.467 \cdot 10^{14}}{3.7 \cdot 10^{10}} \approx 0.39610^4 \text{Ci}$$