

Answer on Question #51435, Chemistry, Physical Chemistry

Question: For ^{214}Bi , the half-life period is 19.7 minutes. Calculate the radioactive decay constant. Also calculate how much of 1 gram sample of ^{214}Bi will remain after 78.4 minutes.

Answer: $T_{1/2} = 19.7$ minutes.

$$\lambda = \frac{0.693}{19.7} = 0.03518$$

So, radioactive decay constant is 0.03518. Now remaining amount of substance can be calculated:

$$N_t = N_0 e^{-\lambda t}$$

$$N_t = 1 \times e^{-0.03518(78.4)} = 0.064 \text{ gram}$$

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