Answer on Question #74076, Chemistry / Inorganic Chemistry

Normal water contains isotope of hydrogen ^3H, tritium. It has a half-life of 12.3 years. Determine the age of a bottle of wine whose ^3H radiations is about 1/10 that present in new wine.

Solution

In 12.3 years the radiation would be 1/2 of the radiation of new wine.

In 2×12.3 years the radiation would be 1/4 of the radiation of new wine.

In n×12.3 years the radiation would be $1/2^n$ of the radiation of new wine.

If $1/10 = 1/2^n$ then find n :

$Log_2 10 = 3,32$

Find the age of the bottle:

A = 12.3 × 3.32 = **40.8 (y)**

Answer

The age of a bottle of wine whose ^3H radiations is about 1/10 that present in new wine is **40.8 years.**