

Honors Chemistry

Half-life questions

1. The reaction $Z \rightarrow \text{products}$ is first order, with a rate of $0.0025 \text{ mol L}^{-1}\text{s}^{-1}$ when $[Z]$ is 0.05 mol L^{-1} . What is the half life of the reaction in minutes?
2. The reaction $A \rightarrow \text{products}$ is second order. When the rate is $0.01 \text{ mol L}^{-1}\text{s}^{-1}$, and $k = 0.4 \text{ L mol}^{-1} \text{ s}^{-1}$, what is the half life of the reaction in minutes?
3. A certain radioactive element has two common isotopes, a stable one, and a radioactive one that decays to the stable one with a half life of 2200 years. The isotopic mix is 20% radioactive upon formation. A 2.50g sample of the element was found to be about 0.08g radioactive isotope, and the rest stable. Approximately how old is the sample?
4. A certain radioactive element has two common isotopes, a stable one, and a radioactive one that decays to the stable one with a half life of 15,000 years. The isotopic mix is 3% radioactive upon formation. A 2.50g sample of the element was found to be about 0.001g radioactive isotope, and the rest stable. Approximately how old is the sample?
5. How many grams of a 5.0g sample will remain after:
 - a) one half-life
 - b) three half lives
 - c) six half lives
6. What percent of a substance will remain after:
 - a) one half-life
 - b) three half lives
 - c) six half lives