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Lab No. (2)

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Geochronology

Questions:

Q1: Mass spectrometry of different minerals in a igneous rock yielded the following table of values for the concentrations of ^{87}Sr originating from the radioactive decay of ^{87}Rb , with the concentration expressed relative to the concentrations of ^{86}Sr of non-radioactive origin.

Mineral	$^{87}\text{Sr}/^{86}\text{Sr}$	$^{87}\text{Rb}/^{86}\text{Sr}$
A	0.709	0.125
B	0.715	0.418
C	0.732	1.216
D	0.755	2.000
E	0.756	2.115
F	0.762	2.247

Express on a $^{87}\text{Sr}/^{86}\text{Sr} - ^{87}\text{Rb}/^{86}\text{Sr}$ diagram the isochron corresponding to the formation of the rock, and calculate the age of the rock. Take $\lambda = 1.42 \times 10^{-11} \text{ yr}^{-1}$.

Q2: Magma with a material proportion of $^{87}\text{Sr}/^{86}\text{Sr}$ equal to 0.709 crystallizes producing a series of rocks with different concentrations of ^{87}Rb with respect to the content of ^{86}Sr :

Sample	$^{87}\text{Rb}/^{86}\text{Sr}$
A	1.195
B	2.638
C	4.892
D	5.671

- (a) Calculate the proportions of $^{87}\text{Sr}/^{86}\text{Sr}$ and $^{87}\text{Rb}/^{86}\text{Sr}$ that these rocks will have after 500 Myr. Take $\lambda = 1.42 \times 10^{-11} \text{ yr}^{-1}$.
- (b) Express in a $^{87}\text{Sr}/^{86}\text{Sr} - ^{87}\text{Rb}/^{86}\text{Sr}$ diagram the isochron corresponding to $t = 0$ and 500 Myr.