# IZOTOPNA GEOLOGIJA

## 3. K/Ar metoda datiranja

1. **Biotit separiran iz kvarc-monzonita sadrži 8,45% $K_2O$ i $6{,}016\times10^{-10}$ mol/g radiogenog $^{40}Ar$. Odredi K/Ar starost tog minerala ako je $\lambda_e=0{,}584\times10^{-10}$ god$^{-1}$, $\lambda_\beta=4{,}72\times10^{-10}$ god$^{-1}$, $^{40}K/K=1{,}19\times10^{-4}$.**

$\omega(K_2O, \text{biotit}) = 8{,}45\% = 0{,}0845$ $\quad {}^{40}K/K = 1{,}19\times10^{-4}$

${}^{40}Ar^* = 6{,}016\times10^{-10}$ mol/g

$\lambda_e = 0{,}584\times10^{-10}$ god$^{-1}$

$\lambda_\beta = 4{,}72\times10^{-10}$ god$^{-1}$ $\Big\}$ $\lambda = \lambda_e + \lambda_\beta = 5{,}304\times10^{-10}$ god$^{-1}$

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$t = ?$

$$t = \frac{1}{\lambda}\left[\frac{{}^{40}Ar^*}{{}^{40}K}\left(\frac{\lambda}{\lambda_e}\right)+1\right] = 47{,}87\times10^6 \text{ god}$$

$N({}^{40}Ar^*) = n \cdot N_A = 3{,}6\times10^{14}$ atoma/g

$N({}^{40}K) = m(K)\cdot N_A \cdot ({}^{40}K/K) = 1{,}28\times10^{17}$ atoma/g

$$\omega(K, \text{biotit}) = \frac{2A_r(K)}{2A_r(K)+A_r(O)} \times \omega(K_2O, \text{biotit}) = 0{,}07$$

$$n(K) = \frac{m(K)}{A_r(K)} = \frac{\omega(K)}{A_r(K)} = 1{,}79\times10^{-3} \text{ mol/g}$$

2. **Hornblenda iz istog uzorka sadrži 0,6078% $K_2O$ i $0{,}4642\times10^{-10}$ mol/g radiogenog $^{40}Ar$. Odredi K/Ar starost tog minerala koristeći konstante gore navedene.**

Rj. $t = 50{,}92\times10^6$ god