

IZOTOPNA GEOLOGIJA

2. Rb/Sr metoda datiranja

1. Odredi starost biotita čiji $^{87}\text{Sr}/^{86}\text{Sr}$ omjer iznosi 1,0000, $^{87}\text{Rb}/^{86}\text{Sr}$ omjer 46,147 a početni $^{87}\text{Sr}/^{86}\text{Sr}$ omjer je 0,7035. ($\lambda(^{87}\text{Rb})=1,39 \times 10^{-11} \text{ god}^{-1}$).

$$^{87}\text{Sr}/^{86}\text{Sr}=1,0000$$

$$^{87}\text{Rb}/^{86}\text{Sr}=46,147$$

$$(^{87}\text{Sr}/^{86}\text{Sr})_0=0,7035$$

$$\lambda(^{87}\text{Rb})=1,39 \times 10^{-11} \text{ god}^{-1}$$

t=?

$$t = \frac{2,303}{\lambda} \log \left[\frac{\frac{^{87}\text{Sr}}{^{86}\text{Sr}} - \left(\frac{^{87}\text{Sr}}{^{86}\text{Sr}} \right)_0}{\frac{^{87}\text{Rb}}{^{86}\text{Sr}}} + 1 \right]$$

$$t = \frac{2,303}{1,39 \times 10^{-11}} \log \left[\frac{1,000 - 0,7035}{46,147} + 1 \right]$$

$$t=461 \times 10^6 \text{ god}$$

2. Odredi $^{87}\text{Sr}/^{86}\text{Sr}$ omjer u biotitu iz prethodnog zadatka prije 250×10^6 god.

$$^{87}\text{Sr}/^{86}\text{Sr}=1,0000$$

$$^{87}\text{Rb}/^{86}\text{Sr}=46,147$$

$$t^*=250 \times 10^6 \text{ god}$$

$$\lambda(^{87}\text{Rb})=1,39 \times 10^{-11} \text{ god}^{-1}$$

$$(^{87}\text{Sr}/^{86}\text{Sr})_0=?$$

$$t = \frac{2,303}{\lambda} \log \left[\frac{\frac{^{87}\text{Sr}}{^{86}\text{Sr}} - \left(\frac{^{87}\text{Sr}}{^{86}\text{Sr}} \right)_0}{\frac{^{87}\text{Rb}}{^{86}\text{Sr}}} + 1 \right]$$

$$\frac{\lambda}{2,303} t = \log \left[\frac{\frac{^{87}\text{Sr}}{^{86}\text{Sr}} - \left(\frac{^{87}\text{Sr}}{^{86}\text{Sr}} \right)_0}{\frac{^{87}\text{Rb}}{^{86}\text{Sr}}} + 1 \right]$$

$$\text{anti log } \frac{\lambda}{2,303} t = \left[\frac{\frac{^{87}\text{Sr}}{^{86}\text{Sr}} - \left(\frac{^{87}\text{Sr}}{^{86}\text{Sr}} \right)_0}{\frac{^{87}\text{Rb}}{^{86}\text{Sr}}} + 1 \right]$$

$$\left(\text{anti log} \frac{\lambda}{2,303} t - 1 \right) \frac{{}^{87}\text{Rb}}{{}^{86}\text{Sr}} = \frac{{}^{87}\text{Sr}}{{}^{86}\text{Sr}} - \left(\frac{{}^{87}\text{Sr}}{{}^{86}\text{Sr}} \right)_0$$

$$\left(\frac{{}^{87}\text{Sr}}{{}^{86}\text{Sr}} \right)_0 = \frac{{}^{87}\text{Sr}}{{}^{86}\text{Sr}} - \left(\text{anti log} \frac{\lambda}{2,303} t - 1 \right) \frac{{}^{87}\text{Rb}}{{}^{86}\text{Sr}}$$

$$\left(\frac{{}^{87}\text{Sr}}{{}^{86}\text{Sr}} \right)_0 = 1,0000 - \left(\text{anti log} \frac{1,39 \times 10^{-11}}{2,303} 250 \times 10^6 - 1 \right) 46,147$$

$$\left(\frac{{}^{87}\text{Sr}}{{}^{86}\text{Sr}} \right)_0 = 0,8394$$