

GY303 Igneous & Metamorphic Petrology: Trace Element Fractionation Problem

Given that a source rock has the following composition:

25ppm Rb

30% plagioclase

20% K-feldspar

30% muscovite

20% quartz

Find the Rb concentration in the melt and solid phases when this system consists of 40% melt and 60% solid starting with the above mineral proportions. The distribution coefficients for the minerals are below:

$$K_D^{\text{Rb}} (\text{plagioclase}) = 0.3$$

$$K_D^{\text{Rb}} (\text{K-feldspar}) = 3.2$$

$$K_D^{\text{Rb}} (\text{muscovite}) = 1.7$$

$$K_D^{\text{Rb}} (\text{quartz}) = 0.04$$