

MODIFICATION OF SANIDINE Rb-Sr AND O ISOTOPIC SYSTEMS DURING STRUCTURE ORDERING. K. N. Shatagin¹, V. N. Volkov¹, B. G. Pokrovsky², ¹ Inst. of Geology of Ore Deposits (IGEM) RAS, 35, Staromonetny Per., 109017, Moscow, Russia, shat@igem.msk.su, ² Geological Institute (GIN) RAS, 7, Pyzhevsky Per., 109017, Moscow, Russia, pokrov@ginran.msk.su

It is widely accepted that sanidine is a very reliable geochronometer for dating volcanic rocks. Unfortunately, it is rather an exception than a rule to find sanidine in acid volcanic rocks as it commonly is modified to a low temperature feldspar with higher degree of ordering. Transformation of former to latter commonly occurs under hydrothermal conditions when solutions either promote structural ordering of the feldspar and serve as a transport media. Therefore, it is critical for geochronological interpretation to realize what does happen with sanidine isotopic systems during the alteration?

We studied sanidine and products of its alteration separated from a subvolcanic rhyolite sample. Age of the studied rhyolite is estimated to be older than 299 ± 4 Ma from the K-Ar age of stratigraphically younger basaltic layers overlying rhyolitic part of the sequence.

Limpid sanidine of the sample forms phenocrysts that are partially altered to different degrees. Weakly altered grains may have slightly turbid, white-colored, nebular-like parts at the grain boundaries and along cracks, whereas the rest of grain is limpid. More altered grains became completely turbid, however one may still see small crystal-clear parts. These grains are macroscopically white. And finally, completely altered grains consist of turbid pink-colored feldspar.

Thoroughly separated fractions of limpid sanidine, partially altered sanidine, white and pink feldspars have wide range of $^{87}\text{Rb}/^{86}\text{Sr}$ ratios from 15.99 (sanidine) to 48.05 (pink feldspar). The respective differences in Rb and Sr content are also observed. Isochron through the points give an age of 263 ± 5 Ma that is presumably lower than the true age of the rhyolite. So, the process of sanidine alteration was taking place much later than the emplacement of the subvolcanic body. Our data imply that this process was accompanied by loss of Sr from the altering sanidine and gain of Rb.

Value of $\delta^{18}\text{O}$ in the studied fractions ranges from 8.05‰ in sanidine to 9.15‰ in pink feldspar. If sanidine crystallized in equilibrium with quartz ($\delta^{18}\text{O} = 9.1$ ‰), then the temperature of their formation was more than 900°C , that is consistent with magmatic origin of both minerals. Oxygen isotope composition of the low-temperature feldspar is not in equilibrium with that of the quartz, this may be explained by that colored feldspars are the products of some low temperature process.

The foregoing suggests that despite the alteration process occurred, limpid sanidine kept its Rb-Sr and O-isotope systems closed. This allows to use remnants of a primary sanidine for reliable dating and isotope geochemistry study.