

K-Ar age of K-feldspar from metagranite in UHP unit of Dora Maira, western Alps

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K-Ar system dating of phengites from metamorphic rocks in Dora Maira, western Alps has been carried out by many geochronologist, giving the ages from 25 Ma to 630 Ma. It has been considered to be due to excess argon inherited from the continental materials that have suffered the pre-alpine metamorphism.

We have had a working hypothesis that the metamorphic rocks with the peak temperature higher than 600 C-degree have been reset in the K-Ar system. In this study, we tried to carry out K-Ar analyses of K-feldspar of metagranite in UHP unit of Dora Maira, western Alps. The samples were provided from Prof. R. Compagnoni of Torino University. The host rock of the metagranite sample is considered to be a Late Variscan granite (ca. 300Ma).

The metagranite is composed of K-feldspar, plagioclase, quartz and biotite, and minor oxides, having igneous texture. Quartz consists of fine-grained quartz aggregate, probably reflect transition from coesite. Plagioclase has prismatic and original igneous crystal shape, but composed of fine-grained plagioclase and albite, suggesting recrystallization from jadeitic clinopyroxene. White micas also occur as fine-grained crystals around biotite and as minor coarse-grained crystals. EMP analyses of the constituent minerals revealed that K-feldspars have 85-95 % of orthoclase component, biotite, Fe/(Fe+Mg) of 0.2 and Al of 2.6-3.1, and plagioclase, 5-15 % of anorthite component. The fine-grained white micas are phengites with Si of 3.2-3.5, which suggest HP alpine metamorphism although the orthoclase has maintained igneous chemistry.

K-Ar analyses of K-feldspar were carried out. Potassium was analyzed by flame photometry using a 2000 ppm Cs buffer. Argon was analyzed on a 15 cm radius sector type mass spectrometer with a single collector system using the isotopic dilution method and argon 38 spike. The results give K = 11.16 ± 0.22 wt.% and age = 42.6 ± 0.9 Ma, suggesting the igneous K-feldspar has been reset in the UHP metamorphism of P= 35kb and T= 750 C-degree. It supports our working hypothesis mentioned above.

Keywords: Dora Maira, Western Alps, UHP metamorphic rocks, orthoclase, K-Ar age