PYROPHYLLITE MINERALIZATION OF THE URALS AND THE CARPATHIANS

SINYAKOVSKAYA, I. (Institute of Mineralogy UB RAS, Miass, Russia)
E-mail: sin@ilmeny.ac.ru

Deposits and occurrences of pyrophyllite can be divided into five types on the basis of geology and genesis (SINYAKOVSKAYA *et al.*, 1996). The first two are associated with hydrothermally altered rocks in felsic and intermediate volcanogenic suites. They differ by the character of their metasomatites and their subsequent transformations in varying volcanic conditions. The third type includes deposits and occurrences of metamorphic-metasomatic genesis and is caused by greenschist facies transformations of terrigenous-sedimentary interbeds in felsic volcanites. The fourth type is associated with low and mid-temperature stages of hydrothermal vein formation at the limits of volcanogenic and metamorphic strata. Pyrophyllite weathering crusts on metamorphic strata and metasomatites comprise the fifth type. Pyrophyllite mineralization of the Urals and Carpathians is interesting from an economic (types 2 and 3) and a mineralogic point of view (type 4).

Pyrophyllite mineralization of the Urals is believed to be deposits of metasomatites in ensimatic island arcs and Paleozoic marginal seas. Bodies of pyrophyllite are associated with apical and peripheral parts of extrusive and effusive domes. Initial flows of rhyolitic-dacitic lavas have interlayered volcanogenic sedimentary rocks of the same composition. Syn-ore metasomatism is accompanied by a loss of bases and alkali elements, and the introduction of alumina. Titanium and silica are inert. The host rocks are thus transformed to pyrophyllite containing metasomatites in conditions of aggressive waters (pH 1.2–3.0, temperature 250–290 °C) at the presence of H_2S, SO_2, CO_2, HCl, to the subsequent oxidation of SO_2 up to H_2SO_4. (SINYAKOVSKAYA & MASLENNIKOV, 1999).

Mesozoic metamorphosed terrigenous argillaceous strata with pyrophyllite are known in the Carpathians. The Triassic pyrophyllite containing Shela Formation (Carpathians) consists of chlorite, muscovite and coaly slates interstratified with metaconglomerates and psammites. The interlayers contain up to 70 % of pyrophyllite.

Pyrophyllite occurrences in quartz vein hydrothermal systems of the Urals are found in Paleozoic metamorphic rocks. Pyrophyllite was identified as a mineral species by R. Germann in 1829 in the gold-quartz veins at the Berezovsk gold deposit. Pyrophyllite mineralization in Alpine quartz veins of the Carpathians was investigated by G. Popescu and E. Constantinescu. Thermobarometric research indicates a formation temperature of 160–180 °C, at a pressure of no more than 1 kbar.

References

SINYAKOVSKAYA, I., ZAYKOV, V. & KITAGAWA, R. (1996). Materials of the 30th session of the International Geological Congress. p. 679.

SINYAKOVSKAYA, I. & MASLENNIKOV, V. (1999). EUROCLAY '99, Cracow, Abstracts, p. 132.