1.3.P09

Amphibole-bearing assemblages as indicators of microdomain-scale equilibrium conditions in Alpine metamafic rocks of the Meliata Unit, NE Hungary

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The complex polymetamorphic evolution of metamorphosed Mesozoic ophiolitic rocks in NE Hungary was studied by detailed microtextural and mineral chemical analyses of metagabbros and metabasalts. Both preserved their original textures remarkably well, metagabbros preserved their magmatic minerals (especially clinopyroxene) better than metabasalts. The original magmatic whole-rock and mineral chemical features have strong influence on the formation and preservation of the various metamorphic assemblages as testified by the chemically different amphiboles (and other major minerals) formed in various microdomains.

The calculated metamorphic P-T conditions are different for metabasalts and metagabbros. These results are in accordance with the observed petrographic features, out of which the sequence of crystallisation of Na-amphibole and actinolite in the two rock types is the most characteristic. Actinolite is followed by Na-amphibole in metabasalts, while Na-amphibole formed first in the metagabbros.

Equilibrium conditions were not attained in the whole unit of the NE Hungarian Mesozoic ophiolites during the Alpine (Jurassic-Cretaceous) evolution. Additionally, various disequilibrium metamorphic assemblages with several generations of chemically complex amphiboles were formed even in thin scetion scale. Various P-T paths during the tectonic evolution of the accretionalry wedge were experienced by various parts of the dismembered ophiolite sequence, which originally formed a coherent unit, and got in close spatial relation only during the post-metamorphic exhumation processes.

1.3.P10

An investigation of the crystal structure of hematite and specularite: What is the role of composition?

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Five natural samples of relatively pure α-Fe_2O_3 (hematite) were analysed to find differences in chemical composition and structure. The aim of the investigation was to explore possible reasons for the platy habit of specularite and the presence of electrical conductivity (semi-conducting) in some samples by examining differences in composition and structure. The samples were: massive, fibrous, spotted hematite with local concentratons of specularite in a massive matrix, as well as two samples of coarse-grained specularite, one of which was semi-conducting. Analyses were performed using scanning electron microscopy (SEM) and energy dispersive X-ray spectroscopy (EDXS), atomic force microscopy (AFM), electron microprobe, optical microscopy, X-ray diffraction (XRD) and atomic absorption spectrometry (AAS).

The massive sample, believed to be the purest, also contained inclusions of magnetite, Fe_3O_4, in 5-50 µm diameter, in the hematite ground mass. Around the magnetite were rims of secondary goethite, believed to have formed after pyrrhotite. The fibrous sample, however, was much purer with no other phases than hematite detectable. It consisted of long fibres parallel to the c-axis, with nucleation of the fibres beginning in levels. The spotted sample was much more complex in both composition and structure. Other included minerals were magnetite crystals of 5 mm in diamter and small amounts of quartz, calcite and chlorite within the hematite ground mass. Grain-size varied from the finer-grained hematite to larger areas of specular habit and magnetite crystals. The non-conductive sample of specularite had wavy plates of Fe_2O_3 developed after {0001}. Goethite and many primary and secondary sulphide mineral grains were observed on the interlayer planes. With AFM, terraces 2.3 Angstrom high where observed, which corresponds to the height of the hematite octahedral-layer. The semiconductive sample had thicker plates and some minor differences in composition. Interlayer composition differences may help to explain conductivity.