MINERALS OF GYÓD SERPENTINITE BODY, HUNGARY

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In the earlier studies different mineral composition of Gyód serpentinite body were determined from which different conclusions were drawn concerning the ultramafic protolith and its alteration processes. On the basis of X-ray diffraction analysis ERDÉLYI (1970) determined numerous minerals (Table 1) of the serpentinized peridotite. SZEDERKÉNYI (1974) and GHONEIM (1978) claimed that the protolith of the serpentinite must have been pyroxenite or lherzolite or dunite. According to PAPP (1989) the most frequent serpentine minerals are lizardite, chrysotile and polygonal serpentine. BALLA (1985) established that the chemical composition of Gyód serpentinite body is harzburgitic, and stated a multi-step metamorphic evolution path of it.

Table 1: Mineral composition of the Gyód serpentinite body.

Author	Minerals
Erdélyi, 1970	lizardite, hydrochrysotile, clinochrysotile, chlorite, talc, montmorillonite, biotite, muscovite, albite, bytownite, clinoenstatite, tourmaline, magnetite, böhmite, diaspore, lepidocrocite, brucite, wilkeite, calcite, dolomite, ankerite
Ghoneim, 1978	enstatite + olivine, lizardite + chrysotile, chlorite + dolomite, chromite, magnetite, pentlandite, pyrrhotite
Balla, 1985	enstatite$_1$, olivine, enstatite$_2$, anthophyllite, talc$_1$, magnetite$_1$, antigorite, talc$_2$, carbonates, magnetite$_2$, chlorite, Cr-magnetite, chrysotile, lizardite

Twelve samples were chosen for X-ray powder diffraction and microprobe analyses from the whole drilling sequence of the borehole No. Gy-2 on the basis of the preliminary petrographic studies (KOVÁCS & M. TÓTH, 2000) in order to resolve the contradictions of literature.

The main phases of the examined rocks are Fe-Mg phyllosilicates, mostly serpentine minerals (30–60 %), talc (10–30%) and chlorite (10–20%). The determination of multiphase serpentine minerals is rather uncertain, however, in the several samples we analysed chrysotile (probably $2Or_{c1}$ symmetry orthochrysotile) and 1T-lizardite were surely determined. Most samples consist of more than one serpentine mineral, but antigorite was not detected. The most important minor phases are the dolomite, ferrite-spinel, quartz, calcite, orthopyroxene and olivine. Regarding phyllosilicates, the separated, oriented samples of < 2 μm fraction represent Mg-chlorite, and swelling phase is not detected. On the base of peak maxima between 7.06–7.10 Å and 3.48–3.53 Å, the presence of kaolinite can be precluded.

By means of microprobe analysis we tried to determine the chemical composition of the relict minerals. Olivine has 90–91% forsterite content, orthopyroxene can be characterised by 90–92% enstatite component and spinels consist of 57–59% chromite and 22–28% magnetite, respectively. General occurrence of plagioclase, clinopyroxene and amphiboles were not pointed out. Although completely serpentinized amphiboles can be seen as bastites, these can not be identified. Fresh amphiboles can only be found in one sample where they occur together with talc in the alteration rim of enstatite. Unaltered anthophyllite was found only in a special location, near an aplite dyke.

The high ratio of forsterite component in olivine may suggest that by the partial melting of a lherzolitic protolith, a residuum of harzburgitic composition could have formed in the upper mantle, representing the lower part of an ophiolite sequence.

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