

Mineralogy, textural relations and mineral compositions of the metaperidotites from the Naghadeh area, West Azerbaijan province

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Abstract: The Naghadeh metamorphic complex at the West-Azerbaijan Province is located at termination of the NW Sanandaj-Sirjan Zone. Major varieties of the metamorphic rocks in this area are: amphibolites, greenschists, marbles and metaperidotites. The metaperidotites are classified into two groups, serpentinised metaperidotites and serpentinites. Orthopyroxene, clinopyroxene, olivine and spinel are the magmatic relict minerals in the serpentinised metaperidotites. Mineral chemistry of the orthopyroxene has been determined as $\text{Ca}_{0.03-0.06}\text{Mg}_{1.68-1.69}\text{Fe}^{2+}_{0.17-0.18}\text{Cr}_{0.02}\text{Al}_{0.07-0.09}^{\text{M}}(\text{Al}_{0.02-0.05}\text{Si}_{1.95-1.98})^{\text{T}}\text{O}_6$. Chemical formula of the analysed clinopyroxenes is $\text{Di}_{96-98}\text{Hd}_{1.0-3.0}\text{Ae}_{0.0-1.0}$. The composition of olivine is considerably homogeneous ($\text{Fo}_{86-50}\text{Fa}_{13-50}$). On the basis of the mineralogical and textural evidence, the protolith composition in the investigated metaperidotites could be considered as lherzolite and rarely harzburgite and dunite. The serpentine polymorphs in the studied metaperidotites are distinguished based on the mineralogical and textural features. In this regards, chrysotile and lizardite are the low temperature polymorphs which occur within paragenesis, containing talc and calcite/magnesite. During prograde metamorphism, chrysotile and lizardite are disappeared as antigorite co-existing with termolite/actinolite and clinocllore are formed. The metamorphic events in the Naghadeh peridotites can be considered in two stages; (1) metasomatic stage under H_2O -bearing fluid conditions at $T < 280^\circ\text{C}$ and (2) the prograde regional metamorphism under inception of amphibolite facies ($T \sim 500^\circ\text{C}$ and $P \sim 7\text{kbar}$). Considering the Naghadeh metamorphic complex in northwestern extension of the Sanandaj-Sirjan Zone, the prograde metamorphic stage of the Naghadeh metaperidotites can be considered comparable to the metamorphic events from the Sanandaj-Sirjan Zone, corresponding to the closure of Neotethys and final continental collision.

Keywords: *metaperidotite; serpentine; Naghadeh; Sanandaj-Sirjan Zone; NW Iran.*

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