Mineral chemistry and thermobarometry of amphibolites from the Qotur metamorphic complex (West Azerbaijan Providence, NW Iran)

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Abstract: The Qotur metamorphic complex consists of metabasites, gneisses, marbles and calc-silicates as well as serpentinites which is cropped out at the west border of West Azerbaijan and Turkey. The amphibolites from the Qotur metamorphic complex can be classified as two types of ortho- and para-amphibolites. Minerals in this ortho-amphibolite are hornblende, plagioclase, zircon, titanite, and opaque minerals. The para-amphibolites are characterized by presence of calcite and quartz in addition to amphibole and plagioclase in their mineral assemblages. Tremolite/actinolite, chlorite and sericite are the retrograde phases of the green schist facies. Granoblastic and nematoblastic textures are the common textures of these rocks. Investigation of mineral chemistry and P-T estimations of amphibolites are the aim of this project. Based on electron microprobe analyzes on amphibolites, the amphibole and plagioclase compositions are determined as magnesio-hastingsite and oligoclase, respectively. Plotting of amphibole and titanite compositions on Ti vs. Si and Fe vs. Al diagrams respectively, shows their metamorphic genesis. The thermobarometry results of amphibolites have been obtained on the basis of amphibole and plagioclase compositions as well as utilizing of petrogenetic grids and experimentally determined phase diagrams. The peak metamorphic temperatures and pressures are estimated about 550-650°C and 6-8 Kb. The geothermal gradient is calculated about 25 °C/Km for the obtained temperatures and pressures which corresponds with continental collision conditions. It seems that Cretaceous closure of the Neotethys and its subsequent continental collision during Late Oligocene- Miocene formed the studied amphibolites at the continental crust of the Qotur area.

Keywords: Amphibolite; mineral chemistry; thermo-barometry; Qotur; NW- Iran.

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