

The study of mineral chemistry and estimation of metamorphic temperature and pressure of the garnet amphibolites from the Hamedan area

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Abstract: Garnet amphibolite is a member of the Hamedan regional metamorphic rocks (the Sanandaj-Sirjan zone). The present study is the first report of mineral compositions and P-T condition of the Hamedan region area garnet amphibolites. The garnet amphibolites can be divided into two varieties based on their mineral assemblages including epidote garnet amphibolite and biotite garnet amphibolite. Electron microprobe analysis show that they contain magnesio- hornblende, andesine and syderophyllite biotite and their garnets have chemical zoning with almandine and pyrope increasing towards the rims. Thermobarometry studies indicate that these rocks have been metamorphosed to lower to middle-amphibolite facies but the biotite bearing samples endured higher metamorphism degree that is consistent with their mineral assemblages. Although, regarding the relatively small differences between the estimated pressures and temperatures, different chemical composition of their parent rocks should be considered as a factor for determination of their final mineral assemblages. Whole rock analysis together with the mineral assemblages show that the garnet amphibolites are of para-amphibolite type and high K₂O contents of the biotite bearing ones is the most important difference between these rocks which can be attributed to high impurities of the parent rocks. Overall, the thermobarometry results are consistent with high T-low P metamorphism (andalusite-sillimanite series) that is characteristic for the Sanandaj-Sirjan zone.

Keywords: *garnet amphibolite; para-amphibolite; thermobarometry; Sanadaj-Sirjan; Hamedan.*

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