

Investigation on the mineral chemistry and the role of biotite total aluminum in detecting the type of mineralization in the intrusive bodies of Karaj-Taleghan axis

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Abstract: The intrusive bodies of Karaj-Taleghan axis in Central Alborz constitute, intruded the pyroclastic rocks of Karaj Formation in the form of sill, lopolith, stock and plug with distinct distribution. Based on microscopic studies, these bodies have similar lithological composition and include olivine gabbro, olivine monzodiorite, olivine monzonite, pyroxene monzonite with felsic dikes of syenite. The major minerals of these rocks are plagioclase, alkali feldspar, pyroxene, olivine and biotite. Biotite is one of the most prominent ferromagnesian mineral in the studied bodies. Compositionally, it is plotted between the field of annite and siderophyllite. Most of these biotites are primarily magmatic and some are plotted in the field reequilibrated area. Based on the FeO*, MgO and Al₂O₃ binary and ternary diagrams, the studied biotites plot in the calc-alkaline orogenic field and crystallization temperature has been calculated between 640° to 770 °C. Furthermore, the calculated pressure of biotite crystallization, based on Al barometer, is 0/27 to 2/58 KB (average 1/06 KB). The total aluminum content of biotite in intrusive bodies at Karaj-Taleghan axis ranges from 2/25 to 3/01. Ziyaran plutonic complex shows good potential for iron-copper mineralization and Prachan and Shekarnab bodies show high potential for lead and zinc mineralization.

Keyword: Mineral chemistry; biotite total aluminum; Central Alborz; sill; Thermobarometry.

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