Using minerals chemistry of plagioclase for the study of magma crystallization process in Ravanj intrusive (NE Delijan)

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Abstract: The Ravanj intrusive, with tonalite, quartz-diorite, and microquartz-diorite composition, is exposed in the West of Ravang Village, NE Delijan, in Urmia-Dokhtar zone. Plagioclase is observed in three different sizes (coarse, intermediate, and microcrystalline) in the composition of in Ravanj intrusive. Most of the coarse crystals are zoned while intermediate and microcrystalline show polysynthetic and pericline twins. The lack of inclusions in the center of plagioclase and An versus K₂O with a linear trend indicate that plagioclase is the main magma phase. The chemistry of polysynthetic crystals is in the range of An₃₀.₉₆ to An₃₈.₇₅, and the variation of Fe₈₆₆ is the same as An, which determine normal crystallization state with temperature equilibrium. The chemistry of zoned plagioclase with oscillating zoning are analyzed from rim to rim, which is the minimum and maximum of An in microquartz-diorite is An₃₆.₅₈ to An₆₀.₉₄ and in tonalite is An₄₁.₉₃ to An₅₄.₁₂ respectively. The rim-to-rim trend of An and Fe, Mg, and Ti elements in the zoned plagioclase shown oscillatory zoning which indicate that crystallization process of fractional crystallization accompanied by the recharges of mafic magma in the state temperature equilibrium. The recharges of mafic magma in the center of intrusive are higher than the margin.

Keywords: minerals chemistry of plagioclase; recharges of magma; Ravanj intrusive; Urmia-Dokhtar zone.