F and Cl in biotites from Zahedan granitic rocks

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Abstract: The Late-Eocene, Early-Oligocene Zahedan granitic rocks are intruded the felsisch zone of the east Iran. They are mainly granodiorite, I-type and calc-alkaline. F and Cl contents in biotite from the Zahedan granitic rocks range from 0.1 to 0.66 and 0.01 to 0.09 wt. %, respectively. F contents in the biotites are negatively correlated with $X_{Ti}$ and Cl contents and positively are correlated with $X_{Si}$ and Mg/(Mg + Fe). Values of the calculated log($f_{H_2O}/f_{HF}$) and log($f_{H_2O}/f_{HCl}$) of fluid in equilibrium with the chemical composition of biotite range from 3.98 to 4.90 and 1.41 to 2.63, respectively. The contour lines representing these values are different with slope of trend of biotite composition suggesting, the fluid composition also play some role in incorporation of F in biotite in addition to the chemical structure of biotite. IV (F) for biotites in the Zahedan granitic rocks is similar to those of igneous rocks and porphyry Cu ore deposits and IV (Cl) of biotites in the Zahedan granitic rocks is similar to those of hydrothermal and ore forming systems and those of granitic rocks. Based on the IV (Cl), biotites from the Zahedan granitic rocks tend to be more Cl rich than comparable values from biotites in other granitic rocks and less Cl rich than those of porphyry Cu ore deposits. Calculated IV (F/Cl) of biotites from the Zahedan granitic rocks is more similar to ore-forming systems such as porphyry Cu ore deposits. Therefore, the chemical composition of biotites from the Zahedan granitic rocks was interacted with hydrothermal solutions.

Keywords: Zahedan granite, Biotite, F and Cl, $f_{H_2O}/f_{HF}$, $f_{H_2O}/f_{HCl}$, IV(F), IV (Cl).