Mineral chemistry of Al in biotite for determination of temperature and pressure of copper mineralization in the Jebale Barez plutonic complex

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(Received: 16/3/2015, in revised form: 22/6/2015)

Abstract: Jebale-Barez plutonic complex is composed of granitoid intrusive bodies and is located in the east-northeast Jiroft, southeastern Kerman Province. The plutonic complex is composed of granodiorite, quartzdiorite and granite - alkali granite. The plutonic rocks are mainly composed of plagioclase, alkali-feldspar, biotite, amphibole and quartz. Based on microprobe analysis, plagioclase compositions vary from andesine to labradorite and alkali feldspars occur as orthoclase. Biotite is the common ferromagnesian mineral in Jebale-Barez plutonic complex. Compositionally, it is situated between annite and siderophylite. Most of these biotites are primary magmatic, but some are located in reequilibrated area. The study of oxidation and reduction state of their source magma by biotite chemistry indicates the increasing of oxidation conditions and high oxygen fugacity. Therefore, biotite rich granitoids of Jebale-Barez plutonic complex are I-type or related to magnetite series and the estimated oxygen fugacity imply oxidation magma and its formation in convergent plate boundary. Emplacement or crystallization temperature of the Jebale-Barez plutonic complex, based on the two feldspar thermometer, ranges between 550 to 750 °C and based on Ti-in-Biotite thermometer ranges between 672 to 720 °C. Al-barometer shows that the pressure of biotites crystallization is 0.43 to 1.61Kbar and the Al^T content of biotite is 2.1 to 2.8. Jebale-Barez plutonic complex has a good ability for copper mineralization based on Uchida et al Method.

Keyword: Jebale-Barez plutonic complex; mineral chemistry; thermobarometry; Al^T content of biotite.

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