

## Geothermobarometry of Markouh Dacite (NE Birjand) and its Amphibolitic Xenoliths

M. H. Yousefzadeh<sup>\*1</sup>, M. Sabzehei<sup>2</sup>

1- Research Center for Earth Sciences, Faculty of Sciences, Birjand University, Birjand, Iran.

2- Department of Earth Sciences, Geology Survey of Iran, Tehran, Iran

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**Abstract:** The amphibolitic xenoliths are the most abundant xenoliths in the Markouh dacitic dome northeast of Birjand. The Markouh dacite is composed of plagioclase, quartz, green hornblende, biotite, magnetite and amphibolitic xenoliths that are containing brown- green hornblende, plagioclase  $\pm$  biotite  $\pm$  quartz  $\pm$  pyroxene. Determination of temperature and pressure of these rocks, based on Al content in amphibole, indicate that green hornblende of host rock are formed in 784-804 °C temperature and 5-6 Kbar pressure equivalent to 20.44-23.52 Km depths and xenoliths are formed in 777-845 °C temperature and 5-7.5 Kbar pressure equivalent to 20-30 Km depths. The more extensive P-T domains for amphibolitic xenoliths to host rocks show that they are formed at first stage during a regional metamorphism from ophiolitic basement in the amphibolite facies. Then with increasing of P-T in the late amphibolite and early granulite facies, green hornblende changed to brown hornblende plagioclase riching in Ca and clinopyroxene is formed. At last, the pyroxene amphibolites falling into magma where condition was suitable for the formation of green hornblende and occurred at retrograde contact metamorphism. Thus brown hornblende is changed to green hornblende again. The results of microprobe analysis and microscopic evidence confirmed this matter. The plagioclases in xenoliths are the more rich in Ca to compare with the host rock.

**Keywords:** *Geothermobarometry; dacite; amphibolite; xenolith; Birjand.*

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\* Corresponding author, Tel:09153620118, Fax: (0561) 2502515, E-mail:mhyousefzadeh@yahoo.com