

Crystallisation condition of the Quaternary basanites of volcanic centre Black Rock, monogenetic field Lunar Crater

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The Lunar Crater volcanic field is located in a tension zone Basin and Range Province (USA). This tension is connected with dives oceanic plate under the continental plate [1]. Lunar Crater consists of flows basalt, basanite, trachybasalt has a different age [2]. In this work we investigate the youngest rock – basanite.

The basanite is highly crystalline consisting of about megacrysts (3-10 cm) 30-60 wt% phenocrysts (800-1500 μm) and microphenocrysts (100-800 μm) and 40-60% microlites (<100 μm). This type of crystal allocated on the basis of size and different chemical composition. The basanite contains about 40 wt % of olivine phenocrysts and microphenocrysts; 35 % clinopyroxene phenocrysts and microphenocrysts. The other phenocrysts and microphenocrysts are feldspar and spinel. Phenocrysts of olivine plagioclase and clinopyroxene are the features of dissolution. The groundmass (<100 μm) consist of microlites olivine, clinopyroxene sanidine Ti-magnetite. Megacrysts are crystals range from 1 to 10 cm, are free of inclusions, and are unzoned. Basanite also bearing homeogenic enclaves and amphibole-feldspar-clinopyroxene cumulates. This size 4 mm-1.5 cm. Also in some cumulat identified mineral reinit.

We determined pressure of the formation of clinopyroxene assemblage using the clinopyroxene barometer based on the relationship between pressure and the volumes of the unit cell and polyhedron M1 in the mineral structure [3]. The pressure is 18-20 kbar for megacrysts, for phenocrysts 15-18 kbar, for microphenocryst 6-8 kbar, for microlites 1,5-3 kbar. Moreover megacrysts are depleted of REE, compared with phenocrysts. Possibly, megacrysts are formed from the same basanite magma during earlier stage of crystallization [4]. Oxygen barometer data shows that the grains were formed in Redox conditions about FMQ+0.2. Temperature and oxygen fugacity conditions were estimated for microphenocrysts and groundmass crystallization only.

Bibliography

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