

Anhydrous Melting and Crystallization of Granite from the Transition Zone of the Qilian Orogenic Belt, NW China: An Experimental Study at Atmospheric Pressure

Chiao-wen Liaw¹, Teh-Ching Liu^{1,*}, Yoshiyuki Iizuka², Houg-Yi Yang³

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ABSTRACT

Granite from the transition zone of the Huang Yang Dam in the Qilian orogenic belt, NW China, is studied using a high-temperature furnace at atmospheric condition. Twenty-two runs are made to locate the liquidus temperature, the solidus temperature, and the melting interval of the granite of Huang Yang Dam, Gansu Province. The experimental temperatures range from 1010°C to 1297°C. The duration time is between thirty hours to sixteen days and two hours. Compositions of glass and phenocrysts are analyzed with an electron microprobe.

The experimental results show that the liquidus temperature of the granitic melt is measured at 1296°C and the solidus temperature is lower than 1010°C. The melting interval is higher than 286°C. The liquidus mineral is zircon. The following phases are silica phase (1278°C), hematite (1269°C), titanomagnetite (1257°C), and plagioclase (1186°C). Spinel and apatite are estimated to appear at approximately 1092°C. Finally, the K-feldspar appears at 1057°C. As temperature decreases, the residual melts become depleted in iron, aluminum, calcium, and magnesium; but enriched in silicon and potassium. The differentiated melts of the granitic melt became plagioclase-depleted and quartz-enriched through fractional crystallization.

(Key words: Granite, Qilian fold belt, Experiment, Melt)

¹ Department of Earth Sciences, National Taiwan Normal University, Taipei, Taiwan, ROC

² Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan, ROC

³ Department of Earth Sciences, National Cheng Kung University, Tainan, Taiwan, ROC

* *Corresponding author address:* Prof. Teh-Ching Liu, Department of Earth Sciences, National Taiwan Normal University, Taipei, Taiwan, ROC; E-mail: liutc@ntnu.edu.tw