



An experimental petrological study of a picrite of Fushing, Taoyen County, Taiwan

Teh-ching Liu (1), Ming-yu Hsu (1), and Chin-pao Cheng (2)

(1) National Taiwan Normal University, Earth Sciences, Taipei, Taiwan (liutc@ntnu.edu.tw, 886-2-86637762), (2) Department of Mechatronic Technology, National Taiwan Normal University

A picrite of Fushing, Taoyen county, was experimented in a quenching furnace at atmospheric pressure to study the fractional crystallization of the picritic melt. The picrite was occurred in the bottom of a sill. Diabase and trachyte are successively on top of the picrite. The sill was surrounded by the Tertiary sedimentary strata. The range of experimental temperatures of the picrite is from 1316 °C to 1060 °C. The duration time is from about four hours to about twenty three hours. The mineral phases and the glass compositions in quenching products were analyzed with the SEM-EDS.

The experimental results showed that the liquidus temperature of the picritic melt of Fushing is at about 1314 °C. Olivine crystallized at 1314 °C. Spinel crystallized at 1275 °C. Ilmenite and clinopyroxene crystallized respectively at about 1217 °C and 1165 °C. Finally, plagioclase crystallized at about 1124 °C. The solidus temperature is estimated to be slightly lower than 1060 °C and the melting interval is about 254 °C.

The fractional crystallization of the picritic liquid at atmospheric pressure is controlled by the olivine, spinel, ilmenite, clinopyroxene, and plagioclase. As temperature decreases, the residual melts become enriched in silicon and calcium; but depleted in magnesium, iron, sodium, and titanium. The differentiation trend of the picritic melt is similar to the trends composed of natural rocks, including picrite, diabase, and trachyte of Fushing.