

## **Anhydrous Melting Experiment of a Wannienta Basalt in the Kuanyinshan Area, Northern Taiwan, at Atmospheric Pressure**

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### **ABSTRACT**

A Wannienta basalt from Kuanyinshan, northern Taiwan, is studied using a high temperature furnace at atmospheric pressure. The purpose of this study is to investigate the crystallization sequence of the phenocrysts, to analyze the chemical compositions of the phenocrysts, and to estimate the evolution trend of the magma in the Kuanyinshan area.

Fifteen runs are made to locate the liquidus temperature, the solidus temperature, and the melting interval of the Wannienta basaltic magma. The experimental temperatures range from 1087 °C to 1281 °C. The duration is from five hours to nineteen hours. Compositions of glasses and phenocrysts are analyzed with an electron microprobe.

The experimental results show that the liquidus temperature is located at 1270 °C and the solidus temperature is estimated to be close to 1080 °C. The melting interval is about 190 °C. The liquidus minerals are oxides with compositions in spinel series. The following crystallized phase is olivine at about 1217 °C. Plagioclase and clinopyroxene appear, respectively, at about 1178 °C and 1137 °C. The evolution of the residual magma shows the chemical trend as: enrichment in silicon, aluminum, and alkalis; and depletion in calcium, iron, and magnesium with the decreasing temperature. The fractionation trend of the Kuanyinshan volcanic series is similar to the variation trend of the residual magmas. It implies that the depth for the fractional crystallization of the Wannienta basaltic magma to produce andesites could be modeled at low pressure. The fractionates to produce biotite hornblende andesitic magma could be oxides, olivine, plagioclase, and clinopyroxene.

(Key words: Basalt, Kuanyinshan, Fractional crystallization, Magma)

### **1. INTRODUCTION**

Taiwan is situated at the junction of the Ryukyu arc and the Luzon arc (Yen, 1958).

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