Degassing history of a mid-ocean ridge rhyolite dome on the Alarcón Rise, Gulf of California


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I. Introduction

A 320°-415° water depth rhyolite lava dome and surrounding intermediate-mafic samples on the Alarcón Rise mid-ocean ridge in the Gulf of California was sampled extensively during a 2012 Monterey Bay Aquarium Research Institute expedition at F1.1. The dome occurs near the northern end of the 10°-15° bathymetric trough (F1.1) and is emergent-mid-ocean ridge. Whole rock and mineral geochemistry suggest that the dome formed entirely through oceanic crustal processes (see B. Dreyer et al., V31B-4746 on Wednesday morning). Volcanic rock and volcaniclastic samples from on and around the dome were collected for mineralogical, petrographic, and FOAMS software protocols (Fig. 4). Lapilli vesicularities of 40-67% were measured using bimodal corrected SEM images in ImageJ (Fig. 2E-H). Also occur (Fig. 2C).

Rhyolites are dense to sparsely vesicular (<10%), microlite-rich and contain a variety of phenocryst minerals (Fig. 2B). Intermediate to mafic lava compositions are entirely pillow in form (Fig. 2B) whereas rhyolites exhibit tabular and breccia morphologies (Fig. 2B). Dark glasses, plagioclase, and orthopyroxene also occur.

Rhyolite glass with 8% CO2 was used for ATR experiments greatly reduces the time needed to prepare doubly polished wafers for GI analysis. ATR experiments were standardized using a correction factor based on a best fit line through samples with known H2O content.