

MEASUREMENTS OF TRACE ELEMENT ABUNDANCES IN LAVA VIA NEUTRON ACTIVATION ANALYSIS

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The elemental compositions of lavas vary with the locations of the volcanoes from which they emerged. We have used neutron activation analysis to measure the abundances of 33 different elements in lava samples collected from three different Hawaiian Islands, Tanzania, Rwanda, Uganda, Ecuador, India, and Sicily. Two different neutron irradiations were performed at the McClellan Nuclear Radiation Center to optimize our sensitivities to both short- and long-lived radioisotopes. Gamma-ray counting was done at McClellan, UC Berkeley, and LBNL using large-volume high-purity Ge detectors. Measurements were conducted using gamma-ray singles, coincidence, and anti-coincidence methods in order to optimize our sensitivities to a variety of elements. Standard pottery samples were irradiated and counted as references for approximately 35 different elements. Considerable effort was devoted to searches for iridium in these lava samples. High levels of iridium were found by Alvarez *et al.* in clay material from the Cretaceous-Tertiary boundary suggesting a meteoritic impact. However, some scientists have suggested that volcanic activity instead may have been responsible for the extinction of the dinosaurs. We find no evidence of iridium and set upper limits on its abundance of < 1 ppb in any of our lava samples. Additional results from the measurements will be presented and comparisons will be made between the trace-element compositions of the lavas from these different sites.