Laser Spot Analysis of Noble Gases in Terrestrial Samples: Noble Gas Isotopic Distribution in Phenocrysts in Unzen Dacite Lavas

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Noble gases in plagioclase and hornblende phenocrysts in the Unzen dacite lavas were extracted from a spot with diameters of 300 micrometer using a laser and their isotopic composition were measured. 40Ar/36Ar ratios in a plagioclase showed zonal structure, which varied from 340 in the core to 300 in the rim. Although Ar isotopic zoning was not observed, 40Ar/36Ar ratios showed heterogeneity in a hornblende. Based on relationship between 40Ar/36Ar ratios and 4He/36Ar ratios and unfractionated 38Ar/36Ar ratios, noble gas isotopic heterogeneity in a single phenocryst indicate that noble gas isotopic composition of the magma changed during formation of phenocrysts, probably caused by contamination of atmospheric noble gas derived from groundwater.