

Origin of orange scoria from Omuroyama volcano, Japan

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Origin of color variation of scoria from Omuroyama volcano, Izu peninsula, Shizuoka, Japan, was investigated. In the fresh glass domains, the compositions are homogeneous whereas the color of the scoria widely varies from black to orange. In all units, the orange scoria clasts are homogeneously mixed with the black scoria clasts, and gray scoria clasts are included in some units. Continuous spectra of chemical (bulk clast) compositions correspond to the systematic variation of the scoria color from black to orange. Gray scoria has intermediate composition between orange and black scoria. The orange scoria is richer in Al, Fe³⁺, Si, and Ti and poorer in Ca, Mg, Na, and K than the black scoria. Back scattered electron image observations of the orange scoria exhibit that the volcanic glass includes altered domains in which iron content is higher than the other area of the glass. Electron microprobe analyses, visible diffuse reflectance spectroscopy, and X-ray diffraction indicate the presence of goethite-like ferric iron hydroxide and amorphous aluminosilicate clay minerals like an allophane in volcanic glass.

On possible explanation for the formation of ferric iron hydroxide is a leaching of iron by acid water including contributions from volcanic gasses and a precipitation-crystallization of Fe³⁺ hydroxides and aluminosilicate clay minerals under near neutral pH conditions in Omuroyama volcano.