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# K-Ar, Ar-Ar, FT ages and degassing process of two type of andesitic magma

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The Setouchi volcanic belt in SW Japan is characterized by the occurrence of high-Mg andesites (HMAs) showing MgO $>$ 12 wt% ($SiO_2$, 52%-54%). The compositional similarity between HMAs and the inferred bulk continental crust may suggest their genetic linkages. This study presents K-Ar, Ar-Ar and FT age data for synchronously erupted andesites together HMA (grassy texture) with calc-alkaline andsite (porphyritic texture) from the Setouchi volcanic belt, and Ar isotope evidence for process of microphenocryst-formation during magma mixing accompanying degassing.

The samples collected from Shodo-shima Island are geochemically well in the range of typical volcanics of Setouchi volcanic belt. We applied at least three dating methods to the samples: K-Ar and FT dating for separated micro minerals (plagioclase, hornblende and zircon), Ar-Ar and K-Ar dating for groundmasses. However, the plagioclase separates are also measured non-irradiated the step wise heating method to analyze Ar isotope ratio related to host rock. Desalination treatment was also applied to the samples prior to analysis because they were mostly erupted at sea level. Eliminating the effects of weathering and crustal mixing of terrigenous materials as well as underwater diffusion of gases, we analyzed microphenocryst and groundmass for K-Ar and FT dating and Ar-Ar and K-Ar dating, respectively, which precipitated or solidified after eruption. K-Ar ages were determined using with a GVI-5400 noble gas mass spectrometer and a Z-5010 atomic absorption spectrometer at JAMSTEC. Ar-Ar ages were determined using with a VG-3600 noble gas mass spectrometer at

Radioisotope Center of the University of Tokyo. FT ages were determined by Kyoto Fission-Track Co.

All of eight ages from the Shodo-shima samples fall between 13 and 14 Ma. This indicates quite limited duration of the magmatism in Setouchi volcanic belts, although some samples indicate crustal assimilation observed in their low temperature gas-fractions. Within such samples, showing crustal assimilation signature, the calc-alkaline samples indicated a different Ar-Ar age plateau pattern of spectrum and slow Ar degassing pattern in step wised heating data. It suggests that such melt interacted with granitic basement rocks, as evidenced not only by their Ar isotope ratios from inverse isochron trend and Ar step wised data, but also supported by FT age spectrum. However, HMA samples indicated a true Ar-Ar age plateau spectrum, and it is suggesting no interaction with other magmatic source as evidenced also by Ar isotopic ratios from stepwise heating data and inverse isochron data. However, some xenocryst-like crystal is rarely come from the granitic basement in HMA supported by FT age and single grain Ar isotope ratio. The eruption of HMA magmas is conditioned a rapid degassing, eventually resulting glassy rock in the Setouchi region in contrast to the other crystalline andesite.