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Reduction of extraneous 40Ar contamination for accurate K-Ar age determinations: an experimental study in various sample

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A fundamental assumption of K-Ar dating is that the samples initially contained no radiogenic ^{40}Ar, but sometimes rocks contain radiogenic ^{40}Ar called extraneous ^{40}Ar. Some previous study reported argon isotopes of historical lavas had anomalously high ^{40}Ar/^{36}Ar ratios, and show old apparent ages. Since extraneous ^{40}Ar is likely contained in the phenocrysts and xenoliths, groundmass samples are generally prepared for analysis. Besides, Ozawa et al. (2005) showed fine-grained grandmas samples had less extraneous ^{40}Ar contamination, and suggested that extraneous ^{40}Ar is contained in fluid inclusions or vesicles and released during crushing. We measure argon isotopic ratios in various sizes of young lava samples, and investigated the reduction of extraneous ^{40}Ar contamination. The finer samples roughly showed lower ^{40}Ar/^{36}Ar ratios but more difficult to handling of the preparation such as mineral separation and wrapping in foils for isotopic measurements.

Keywords: K-Ar dating, extraneous 40Ar, sample size