



Fracture formation process by $^{40}\text{Ar}/^{39}\text{Ar}$ dating at the Hishikari epithermal gold deposit, Japan

K. Watanabe (1), K. Sanematsu (1), R. Duncan (2)

(1) Department of Earth Resources Engineering, Kyushu University, (2) College of Oceanic and Atmospheric Sciences, Oregon State University

(wat@mine.kyushu-u.ac.jp/Fax:+81-92-802-3368)

The Quaternary Hishikari high-grade gold epithermal deposit is located in southern Kyushu, Japan. The typical precipitation sequence at the Hishikari deposit is adularia-quartz sequence, and adularia, especially columnar adularia, is often observed beside the hostrock, showing adularia occurred immediately after fracturing. Therefore, the age of adularia is a good indicator of timing of fracturing. We obtained twelve $^{40}\text{Ar}/^{39}\text{Ar}$ Ar ages of adularia from the Hosen-1 vein at -20m level and +62.5m level.

The errors reported as 2 sigma are on the order of 1-3% or less for the plateau ages, and are almost concordant with the isochron ages. In all cases, clear plateaus comprising over 50% of the total extracted gas were obtained. Accordingly, these $^{40}\text{Ar}/^{39}\text{Ar}$ Ar ages of adularia at the Hishikari deposit are reliable enough to discuss the history of fracturing.

A time difference between earlier adularia-quartz sequence and following one shows an interval of fracturing. Since the longest time was between the band U-III and U-IV, the intervals of fracturing range from 30,000 to 140,000 years approximately at the Hosen-1 vein. The band U-III, about 80cm in width, was formed in a very short period by only one vein formation because apparent banding structure was not observed. These results suggest that fracturing occurred intermittently at different temporal intervals rather than continuously at a constant rate. Duration of fracturing is totally about 250,000 years at the Hosen-1 vein and fracturing occurred at least six times in this period.