

# Formation process of Quaternary fissure system in the shallow crust by $^{40}\text{Ar}/^{39}\text{Ar}$ dating -An example of the Hishikari gold deposit-

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Fissure formed in the upper part of crust plays a crucial role for pathways of fluid flow. Although chronological information on the fissure formation is important to discuss the genetic processes, reliable dating work has not succeeded so far. In the case that the fissure is filled with sorts of minerals deposited from the fluid, the fissure is preserved as a vein. Therefore, dating of such minerals gives time-factors of fissure formation in a geologic time scale. Investigation on reliable and precise dating of vein-type mineralization may facilitate to discuss on this issue.

In many studies of epithermal gold deposits, the precision of radiometric ages has not been dealt with satisfactorily. Thus, the timing and duration of mineralization of epithermal veins are almost always not fully elucidated. Errors associated with dating are inevitable, and their extent greatly depends on the method, dating material employed and the age range of activity. Dating of Quaternary samples may give smaller absolute age uncertainties as compared to older samples, even if the relative error is larger. Moreover, one of the best techniques in dating Quaternary ore deposits is the application of  $^{40}\text{Ar}/^{39}\text{Ar}$  chronology on K-rich minerals. The Hishikari gold deposit, being a typical low-sulfidation hydrothermal system, offers an ideal case study for such a chronological approach.

Forty-two adularia and adularia-rich samples were selected from epithermal veins in the Hishikari gold deposit. Except for a few cases, absolute age error for most data ranges from ten to twenty thousand years. These errors are less than half of those of K-Ar age previously reported for adularia from the Hishikari deposit. And then these errors for  $^{40}\text{Ar}/^{39}\text{Ar}$  dating seem to be precise enough to discuss in detail the timing and duration of fracture formation and associated mineralization.