

## Cathodoluminescence observation of sillimanite seams in pelitic metamorphic rocks as an indicator of fluid pathways in the middle crust of continental arc setting (Kasagi and Aoyama areas, Ryoke belt, SW Japan)

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Fibrolite seams commonly developed in the migmatitic gneisses are observed in detail using cathodoluminescence (CL) images. A fibrolite seam originating from a post-tectonic granite vein is characterized by the presence of CL-dark quartz grains and by the absence of plagioclase in the vicinity of the seam. The CL-dark quartz has abundant fibrolite inclusions, and the abundance of inclusions decreases as distance from the seam increases. Quartz grains distant from the seam commonly have CL-bright and fibrolite-free cores. The variation of CL intensity is shown to represent that at  $\sim 395$  nm, probably related to Al in quartz. Microtextural observation suggests that the fibrolite seam is formed through the fluid-rock interaction between pelitic gneiss and a fluid released from the crystallizing post-tectonic granite. Since absence of plagioclase near the CL-dark quartz is not observed in rocks equivalent to protoliths, it is considered that neighboring feldspars are consumed and quartz with fibrolite inclusions either partially or totally recrystallized during the reaction with the acidic fluid. This interpretation is supported by thermodynamic calculation revealing the reaction between plagioclase and an aqueous fluid [low  $aK^+/aH^+$  and low  $aNa^+/aH^+$ ] can produce sillimanite. In the Sil zone of the Kasagi area (Ryoke belt, SW Japan), CL-dark quartz with sillimanite inclusions that does not accompany neighboring feldspars is widely found. These samples also accompany fibrolite mats replacing biotite. Thermodynamic calculation suggests that replacement of biotite by sillimanite is possible through the reaction between biotite and aqueous fluid [low  $aMg^{2+}/(aH^+)^2$  and low  $aK^+/aH^+$ ]. Similar fibrolite seams are found in pelitic schists from the Sil-Kfs zone of the Aoyama area (Ryoke belt, SW Japan). Results from the Aoyama area will be also discussed in the presentation.

Keywords: fluid, fibrolite seam, contact metamorphism, granite, cathodoluminescence