G122-P006 **Room: Poster Session Hall** **Time: May 25**

Evaluation of mylonitization using cathodoluminescence method

Masahiro Kayama[1]; kazumitzu okabayashi[1]; Kazurou Kawamoto[2]; Hirotsugu Nishido[1]

[1] Res. Inst. Nat. Sci., Okayama Univ. Sci.; [2] Oshika MTL Museum

Cathodoluminescence (CL) spectroscopy and microscopy provide useful information on existence and distribution of defect and trace element in materials. CL intensity and peak position depend mainly on activator concentration and crystal fields, which might be related to genetic conditions of rock formation and subsequent deformation. In this study, CL spectroscopy and microscopy have been carried out on feldspar minerals in various fault rocks to evaluate mylonitization in the Ryoke belt.

Mylonite, protomylonite and their source rock (Hiji tonalite) were collected from surface exposures along the Takamoriyama Path in Oshika, Nagano Prefecture. Their polished thin sections were employed for polarized microscopic observation, EPMA analysis and CL measurements. CL color images were obtained by Luminoscope ELM-3R (Nuclide) at acceleration voltage of 15 kV and beam current of 0.5 mA. SEM-CL system, SEM (JEOL: JSM-5410) combined with a grating monochromator (OXFORD: Mono CL2), was used to measure CL spectra in the range from 300 to 800 nm at operation condition of 15 kV and 1.0 nA. CL spectral data were corrected for total instrumental response.

Plagioclase in source rocks has a yellow emission with homogeneous feature of CL intensity in color CL image obtained with Luminoscope. CL of the plagioclase in protomylonite composes of dull yellow emission with bright yellow along the fractures, whereas plagioclase in mylonite exhibits heterogeneous CL feature in color, blue˜yellow˜white, with bright yellow along fractures, whereas protomylonite has yellow CL emission in plagioclase.

CL spectra of the plagioclase in source rock, protomylonite and mylonite have three broad peaks: (1) blue CL peak at around 400 nm, which can be assigned to structural defect in the host lattice as intrinsic center, (2) yellow CL peak at around 570 ˜580 nm related to Mn^{2+} impurity center, and (3) red CL peak at around 750 nm, which is attributed to Fe^{3+} impurity center.

Each plagioclase from different rock type shows different intensity in emission color region of blue, yellow and red. CL intensity in blue CL emission is highest in the plagioclase derived from protomylonite, while lowest one from source rock. It suggests that an increase of shear stress with formation of dynamic recrystallization produces more structural defects, related to blue CL emission, in the lattice of plagioclase. Wavelength of spectral peak in yellow region varies among the plagioclase in different rock types. The peak position of the plagioclase in source rock is at around 580 nm, whereas 575nm for mylonite and 580 nm for protomylonite. This emission can be assigned to impurity center of Mn^{2+} in TO_4 site, of which electrons move from $^4T_1$ to $^6A_1$ with radiative transition. The wavelength of this emission is actually affected by the strength of crystal field around Mn^{2+} ion. Therefore, the shear stress stored in the plagioclase lattice causes the alteration of the structural configuration of TO_4. Such CL behavior could be used to evaluate the degree of mylonitization as an indicator.