Textural analyses for K-feldspar inclusions within a micro-shear zone developed in Teshima granite, the Ryoke metamorphic belt

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The shape change rate of an inclusion grain is controlled by the rounding process resulting from both interfacial tension and diffusion creep caused by differential stress (Toriumi, 1987). Okamoto and Michibayashi (2005) presented a numerical model which explained the shape change rate of a garnet inclusion within a quartz host grain in accordance with deformation conditions such as differential stress and deformation time. In this study, we determined estimate deformation conditions for a micro-shear zone developed in Teshima granite in the Ryoke metamorphic belt. The sample is a biotite granite which is composed of quartz, K-feldspar, plagioclase and biotite with minor muscovite, containing a micro-shear zone with a few centimeters of width. Foliations are defined by shape preferred orientations of minerals such as biotite. The foliations show gradual change from higher angle to lower angle toward the micro-shear zone in several centimeters as decreasing grain sizes of individual minerals. K-feldspar inclusions occur within quartz host grains. We divided thin section of this sample into five domains based on the distance from the micro-shear zone and measure shape factors of K-feldspar inclusions such as grain size (R) and aspect ratio (L) in each domain. Grain sizes of K-feldspar inclusions range from 1 to 100 μm and aspect ratios vary regardless of their grain sizes. We compare the measured L-R distribution patters with those calculated for K-feldspar inclusions following to Okamoto and Michibayashi (2005) and discuss deformation conditions for the micro-shear zone.

Keywords: Teshima granite, Micro-shear zone, K-feldspar inclusions, Textural analyses

