CALCITE PORPHYROBLASTS IN SAMBAGAWA SCHISTS

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Introduction

In Sambagawa schists are frequently found garnet, epidote, plagioclase, amphibole and calcite as porphyroblasts, which contain metamorphic minerals of earlier generation as inclusions. It has been so far clarified that the former four porphyroblasts grew under non-deformational condition during the main phase of the Sambagawa metamorphism (=phase of progressive increase of temperature until the highest temperature) (HARA et al., 1977; TAKAGI & HARA, 1979; MAEDA & HARA, 1983, 1984; TOKUDA & HARA,

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Fig. 1. Diagram showing the localities of the analysed specimens. 1: pelitic schist, 2: basic schist, 3: fault, a and b: localities of analysed specimens, T: Tokyo, N: Nagoya, O: Osaka, In: Ichinose, S: Saikawa A: Aotani.

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Fig. 2. Diagram showing the variation of elongation degree (GE) of calcite porphyroblasts as measured on a thin section normal to the fold axis (data for the specimen from the locality a).

Fig. 3 c-axes fabric diagrams of calcite porphyroblasts. a) data for the specimen from the locality a, b) data for the specimen from the locality b. B_2: axis of B_2-fold, solid straight line: average trend of schistosity.

1983; HARA et al., 1983). In this paper will be described calcite porphyroblasts in basic schists which have been collected from two outcrops in the Sambagawa belt of the Tennyugawa district, Central Japan, (Fig. 1).

**Microtextures of calcite porphyroblasts**

The basic schists, which contain calcite porphyroblasts described in this paper, are of metamorphic grade of zone II of SEKI
(1961) and show minor folds (B2-fold) with axial-plane cleavage of crenulation type (Plate 1). The B2-folds are of the Hizikawa phase which is later than the main phase of the Sambagawa metamorphism (cf. HARA et al., 1977; HARA et al., 1983, Table 1).

As observed on thin sections, most of calcite porphyroblasts are slender prisms in shape (Plate 1). Fig. 2 illustrates the elongation degree (GE=length of the longest axis/length normal to it) of calcite porphyroblasts as measured on the thin sections (B-section) normal to the fold axis. It is between 1.2 and 10.4 with mean value of 4.4. It can be said that calcite porphyroblasts are commonly strongly elongated. The longest axes of calcite porphyroblasts are between 0.33 mm and 5.4 mm with mean value of 1.75 mm in size as measured on the B-sections.

Calcite porphyroblasts are dimensionally randomly oriented on the B-sections (Plate 1). Fig. 3 illustrates the c-axis fabrics of calcite porphyroblasts. It is clear that the orientation of their c-axes is random.

The longest axes of calcite porphyroblasts observed on the B-sections are commonly approximately normal to their c-axes (Fig. 4). Thus, it could be said that calcite porphyroblasts are bounded on the two longest sides by planes normal or subnormal to the c-axis. However, calcite porphyroblasts, whose c-axes are oriented approximately normal to the plane of the B-section, do not show commonly elongated shapes. Thus, the calcite porphyroblasts would be assumed to have pan cake-like shapes flattened normal to their c-axes.

Calcite porphyroblasts contain other metamorphic minerals as inclusions which are dimensionally preferentially oriented forming a single set of schistosity (S1) (Plate 1). S1 represents folded forms. The folds of S1 are quite harmonic with the B2-folds (crenation cleavage) of matrix schistosity (Plate 1). The calcite porphyroblasts can be referred to the type of post-tectonic porphyroblasts (cf. SPRY, 1969). Thus, it can be pointed out that such a metamorphism that was responsible for the growth of calcite porphyroblasts occurred under non-deformational condition after the folding of the Hizikawa phase. This metamorphism must be the Sambagawa metamorphism of the last phase (cf. HARA et al., 1983). Incidentally it is remarked that the folding of the Hizikawa phase began during the Latest Jurassic or Earliest Cretaceous age (HARA et al., 1977).

References


TAKAGI, K. and HARA, I., 1979: Relationship between growth of albite porphyroblasts and deformation in a Sambagawa schist, Central Shikoku, Japan. Tectonophysics, 58, 113–125.

Explanation of Plate I

a : Microphotograph of calcite porphyroblast (c) in the specimen from the locality a. Lower nicol only.

b : Microphotograph of calcite porphyroblasts (c) in the specimen from the locality a. Lower nicol only.