

Internal structure of quartz from the Waga-sennin ore deposit, Iwate Prefecture, northern Japan

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1.Introduction

The hydrothermal environment and growth histories of quartz crystal from the Waga-sennin ore deposit were studied by the fluid inclusions, optical anomaly and etched figures to the quartz wafer using an optical microscope.

2.Specimen

The specimens used are euhedral quartz crystals from the Waga-sennin iron deposit, Iwate Prefecture, northern Japan. Major ore mineral is specular hematite with much amounts of quartz. The genesis of ore deposit has been discussed as that of contact metasomatic origin and that of hydrothermal replacement origin depend by the investigators. Often quartz crystals are covered with micro crystals of calcite. Quartz crystals were cut and polished into wafers perpendicular to c-axis. Quartz is fully transparent with clear growth zoning parallel to the prism face. They are divided into zone-A and zone-B by the internal structure.

3.Results and Conclusion

Many fluid inclusions are found in zone-A and zone-B of the crystal. Particularly fluid inclusions in zone-A show typical negative crystal shape of quartz with three pyramid faces, closely related to the growth of an euhedral crystal. As a result of etching on the (0001) plane, etch pits and etch figures were appeared. The former is of windmill-shape and the later shows the growth zoning parallel to the prism faces. Frondel (1962) revealed that the etch pits of windmill shape represent either the left hand or right hand crystal of the quartz. Etch pits are the important evidence to reveal the existence and the kind of quartz twin. Etch figures showing growth zoning vary the central position of the wafer. It is supposed that etch figures reveal that crystal habits and crystal appearance vary dynamically with crystal growth.

From the observation of distribution of etch patterns of left hand or right hand crystal in the wafers, it reveals that distribution of left or right hand crystal is divided in two sectors whose boundary is formed by composition planes or cracks in the direction of a-axis of the wafer. Although Brazil twin and Dawphine twin are general twins of a single euhedral quartz crystal, it is not easy to apply the case to the classification of twin. For the more discussion, these phenomena should be compared with distribution of left hand or right hand crystal in many wafers from the offer occurrences.

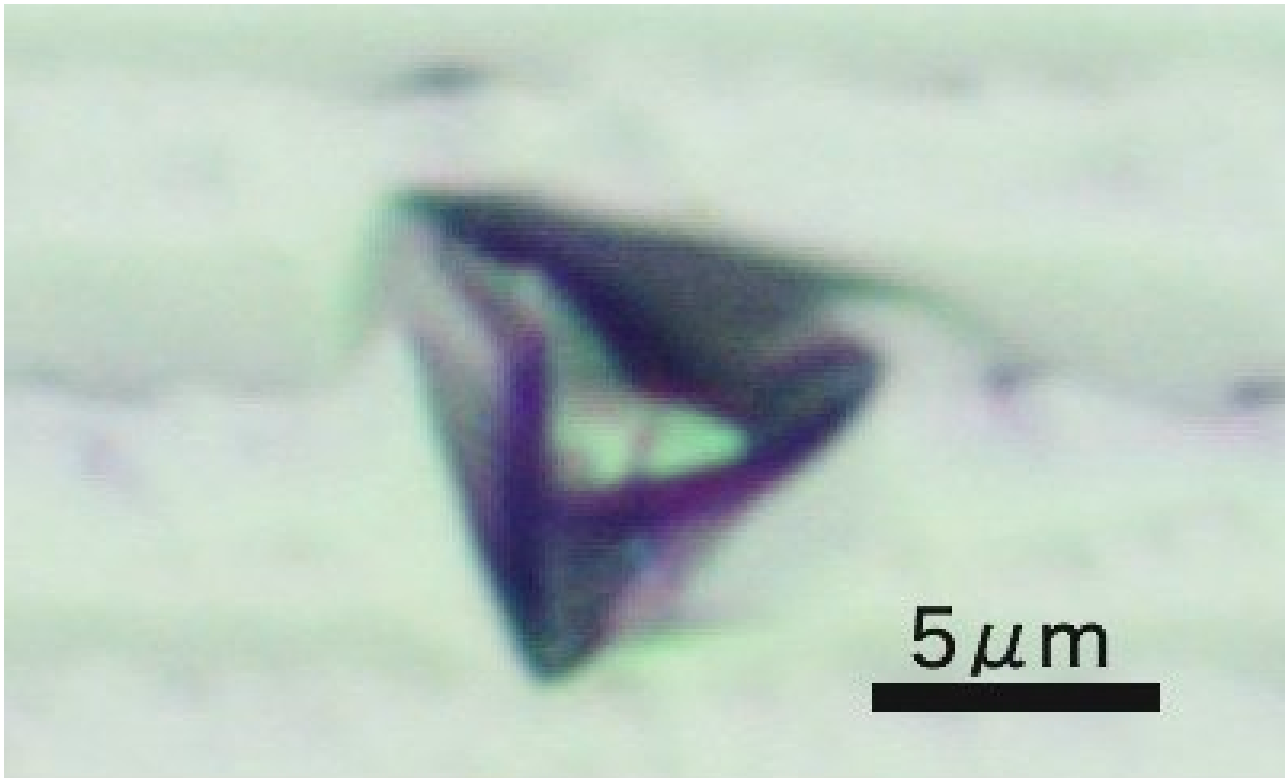


Fig.1. Photomicrograph of an etch pit on (0001) plane of quartz. Windmill-shape represents left hand crystal of quartz.