

Spatial variations of mineral texture and chemical composition of sulfide chimney collected from the Okinawa Trough, Japan

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Recently, a metallogenic study on a seafloor hydrothermal sulfide deposit has been paid much attention owing to the global demand increase for metal resources. However, the petrographic and geochemical information of these hydrothermal sulfide deposits has to be sometimes more sparse and fragmentary compared with those of the ore deposit on land. This situation is largely caused by the difficulty in the dense sampling on a deep-sea floor. Many sulfide chimney samples have been obtained by an intensive investigation through the ROV and HOV dive expeditions, but the detailed mineralization process of the hydrothermal sulfide deposit is still unclear since the sampling of the whole original chimney structure without any disturbances is not an easy operation.

In the KR15-16 Cruise by using R/V KAIREI with ROV KAIKO Mk-IV, we successfully obtained a chimney sample keeping the whole original structure at the west offshore of the Kume Shima Island, middle Okinawa Trough. We report detailed mineralization process of this chimney sample based on the spatial variations of the mineral texture, chemical composition of constituent minerals together with the fluid inclusion.

Electron microprobe, X-ray fluorescence, Laser Raman spectroscopy and microthermometry were applied to this chimney sample which was divided into five parts; two top parts, two middle parts and one bottom part. Alternation of lead and zinc from the center of the chimney to its outer wall, which indicates that rapid oscillation of chemical composition and/or temperature of hydrothermal fluid in a short period.