

Fluid inclusion study of core samples collected from the Iheya North Knoll in the Okinawa Trough

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From July 9 to 26 in 2014, the dive expedition (Exp. 907, CK14-04) was performed at the Iheya North Knoll in the middle Okinawa Trough to confirm hydrothermal seafloor mineralization. The core samples used in this study were obtained from Hole C9015B and C9016B of the research target area. Microscopic observation and fluid inclusion microthermometry were mainly focused to reveal the ore formation condition. The objective of this study is to clarify geochemical characteristics and the point of similarity between Kuroko deposits and seafloor hydrothermal deposits.

The characteristics of the ores collected from Iheya North Knoll are as follows: C9015B samples are pyrite rich but chalcopyrite is minor, therefore, the characteristic of sulfide assemblage is not similar to yellow ore of Kuroko deposits. C9016B samples are divided into two groups. a) At the upper portion, from 29.6 to 32.7 mbsf, only framboidal pyrite could be observed. b) At the lower portion, from 38.1 to 42.1, pyrite is minor, while galena and sphalerite is abundant like Kuroko of Kuroko deposits.

Homogenization temperatures of fluid inclusions in quartz of C9015B range from 266.7 to 338.4°C and the salinity ranges from 0.00 to 6.30 wt. % NaCl eq. Homogenization temperatures of fluid inclusions in anhydrite of C9016B range 271.1 to 348.5°C and the salinity range from 3.2 to 6.1 wt. % NaCl eq. Both the data of fluid inclusion microthermometry of C9015B and C9016B samples are well plotted on the boiling curve of seawater. The fact that low salinity fluid can be observed may support the occurrence of boiling during the formation of the ore in Iheya North Knoll, Okinawa Trough.