

Pb isotope analysis of galena in seafloor polymetallic sulfide deposits from the mid-Okinawa Trough using Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry

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Galena is a major mineral phase that hosts Pb in polymetallic sulfide deposits formed beneath/on a seafloor. The Pb isotope composition of galena reflects the source of Pb, such as volcanic rock and sediment (e.g. LeHuray et al., 1988). We analyzed Pb isotope composition of galena in polymetallic sulfide deposits from the mid-Okinawa Trough using Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry. The analyzed sulfide deposits were obtained by scientific drillings conducted in two active hydrothermal fields, the Izena Hole and the Iheya North Field under the framework of the Next-generation Technology for Ocean Resources Exploration Project.

We revealed considerably homogeneous Pb isotope compositions of the galena samples recovered from the entire depth range of each drilled hole, irrespective of different mineral assemblage and occurrence around the targeted galena grains. Pb isotope composition of galena collected from the Izena Hole was almost equivalent to that reported in the previous study (Halbach et al., 1997). While Pb isotope composition in the Izena Hole displayed similar signature to that of sediment in the Okinawa Trough, Pb isotope composition in the Iheya North Field displayed signature close to that of volcanic rocks. The Pb isotope composition from the Izena Hole where covered with thick hemi-pelagic sediment (~30 m) displayed more radiogenic signature than that from the Iheya North Field which situated on a slope of hill covered with mainly volcanoclastics. These results strongly suggest that the sources of Pb in the polymetallic sulfide deposits are attributed to be contributed from two sources, volcanic rocks and the terrigenous sediments, and their contribution differs according to the geologic setting.