A Raman spectroscopic study on sphalerite from seafloor hydrothermal deposit

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Sphalerite, zinc sulfide mineral (ZnS), is one of the major constituent minerals of hydrothermal sulfide deposit such as vein type deposit, skarn deposit and volcanogenic massive sulfide (VMS) deposit on land as well as deep-sea hydrothermal sulfide deposit. Since sphalerite contains several mole percent of iron, this mineral formula was sometimes depicted as (Zn,Fe)S. Mole fraction of iron in sphalerite grains obtained from seafloor hydrothermal deposits exhibit a wide variety along with occurrence and sulfur fugacity of hydrothermal fluid.
Iron contents in sphalerite grains are usually measured directly by electron probe micro analyzer (EPMA). Recently, the laser Raman spectroscopy method has been applied to sphalerite grains to estimate their iron contents. Based on the previous data, intensities in the Raman peaks around 300 cm^{-1}, 330 cm^{-1} and 350 cm^{-1} change with their iron contents. Sphalerite with low iron contents shows weak two peaks at the Raman spectroscopy around 300 cm^{-1} and 330 cm^{-1}, whereas high-iron sphalerite grain has conspicuous peak around 350 cm^{-1}.
In the present study, we applied the laser Raman spectroscopy method to modern seafloor hydrothermal sulfide deposit in the Okinawa Trough and Izu-Bonin area to comprehend spectroscopic features of sphalerite and their difference among several hydrothermal sites.

Keywords: seafloor hydrothermal deposit, Laser Raman spectroscopy, sphalerite

