

Electrical conductivity and spectral IP characteristics in the rock samples obtained in seafloor hydrothermal area and interpretation of them

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Various geophysical explorations have recently been conducted in the seafloor hydrothermal field to estimate the scale of the seafloor massive sulfide. However, information obtained from geophysical exploration is limited. Therefore, in order to interpret the geological information under the seafloor based on the results of the geophysical exploration, it is necessary that the detailed analysis is carried out on hard-rock and sediment samples obtained on the surface and the lower of the seafloor, for comparing their features with results of geophysical exploration. In this study, we obtained rock samples in several hydrothermal fields; then we measured various physical properties and analyzed the chemical compositions, and we also investigated their relationship. As for physical properties, in particular, electric conductivity and spectral IP characteristics were investigated in detail. In samples with high electrical conductivity, some sulfide minerals, known to have high conductivity, were found to be contained. In spectral IP, some samples having a plurality of frequencies causing a peak in the phase difference of the voltage across the sample was observed. It is thought that this is due to the mixture of a plurality of sulfide minerals having different average particle sizes. In fact, in this study, we succeeded in reproducing the frequency characteristics of the sample by the rock physics model we constructed, assuming such characteristics. In the future work, we will study the consistency of the phenomena observed in this research and our new rock physics model through experiments on artificial samples using plural sulfide minerals of different particle sizes and types.

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