海底熱水鉱床：岩石サンプルの化学組成を組み込んだ電気伝導度モデルの構築

Seafloor massive sulfide: Rock Physics Modeling of electrical conductivity characteristics including chemical compositions

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In recent years, seafloor massive sulfide attract attention as heavy metal resources, and various geophysical exploration has been carried out. However, the information obtained by geophysical exploration is limited, so that it is difficult to estimate the scale of deposits directly from survey results.

One of the reasons for this is the lack of technology for interpreting excessive electrical conduction characteristics in the sea floor hydrothermal area. In addition to excessive electrical conduction by heat hydrothermal water, there are electrical conductions due to the existence of conductive sulfide mineral, dramatically improves the electrical conductivity of the underground. The rock physics model (physical formula) which explains the electrical conduction characteristics of such rock samples has not been developed. Therefore, in this study, we measured various physical properties and analyzed chemical composition by laboratory test. By using these results and with reference to the past research, we constructed new rock physics model. Applying the model for measurement and analysis results, we extract some parameters of the model.

As a result, not only succeeded in reproducing the electrical conduction characteristics of rock samples, but also clearly positive relationship between the parameter of the model and content ratio of some specific sulfide minerals was found. If the electric conductivity can be estimated by giving the content ratio of specific sulfide minerals, It is useful for interpretation of existing physical exploration results (submarine electric exploration etc.).

For the future study, we plan to verify integrity of the model by increasing the number of samples, and also to verify whether existing geophysical exploration results can be reproduced by underground chemical-physical structure model made by applying the rock physics model we constructed.

キーワード：海底熱水鉱床、岩石物理モデル、物理探査
Keywords: Seafloor massive sulfide, Rock physics model, geophysical exploration