

A Spontaneous Potential Survey in the Area Distributed the Clay Layers contained Sulfide Minerals

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1. Introduction

Pyrites or the amorphous material iron sulfide are included in the marine clay layer of Osaka Group. When weathered, these are oxidized and the sulfuric acid element is finally formed.

When sulfide is oxidized, redox potential is generated and a negative potential malfunction is observed in the outcrop neighborhood (Ryoki, 2001). There are many artificial noises and disturbances in the urbanized area. Therefore, the accuracy of the potential measurement is not high. Then, the system which measured the spontaneous potential by good accuracy was developed, and investigated.

In this paper, we report on the comparison between the result and the model experiment. The result of analyzing the sulfur constituent in the marine clay also gathered according to the chemical species is shown.

2. A measurement system and example mapping

When past researches (Ryoki, 2001, Ryoki and Kurita, 2006) in the Senboku area were done, the variation of the potential which responded to the traffic of the vehicle was observed along a main road on where there was heavy traffic. To decrease this influence, observed data were chosen and processed according to filtering with the measuring equipment and recording the wave data in PC. The program for the measurement was produced with VB 2005.

The electrode that stability is high and a peculiar, electromotive power is a little is necessary for measuring earth potential. Ryoki and Kitamura (2005) were made Ag-AgCl non-polarized electrodes. However, there was a problem that the filler balanced filler with the electrolyte and condensed in those electrodes. Then, we canceled these problems by using PVA and glass beads for filler.

The test field is in Ibukino, Senboku. The procedure of the measurement depended on 'Twin Looper methods' (Ryoki and Kurita, 2006). It has been appreciated that the tendency to which potential lowers is admitted in the outcrop of the marine clay as a result of the measurement, and the tendency harmonized correspondence with the geological map (Geological Survey Enterprises Association of Kansai, 1998).

3. Analysis of sulfur according to chemical species and examination by the model experiment

We analyzed the content of the sulfur compound, which Ma3 gathered from the test field, according to the chemical species. As a result, it was able to be confirmed that the degree of the oxidation was low at a fresh sample compared with a sample advanced by weathering.

The stratum model with a water tank was made. The clay layer of Kaolinite which contained 1% FeS had been got in the Toyoura standard sand. The pure water saturated with oxygen was scattered on the model and infiltrated in. After that, an electrical potential distribution was measured. To assume the contrast under the same condition, the distribution was measured by using only of kaolinite without FeS. As a result, it was able to be confirmed that a large negative potential was caused by the existence of the clay layer which contained FeS.

4. Conclusion

In this study, it was able to be confirmed potential was generated when precipitation that contained the oxygen permeated into the marine clay layers included the sulfide. Moreover, it was appreciated that the accurate measurement of the electric potential distribution was judged the presence of some marine clay layers in the field.

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