

## Mineralogical characterization of a stone by using colorimetry

NAKAYAMA, Taishi<sup>1\*</sup>, OGUCHI, Chiaki T.<sup>2</sup>

<sup>1</sup>GRIS, <sup>2</sup>GRIS,Saitama Univ.

In this study, the possibility of the exploitation of visible-reflectance spectrum as the technique to non-destructively specify the mineral species in situ was investigated. Color measurement of various samples was performed using colorimetry. Samples employed were reagents and standard samples, such as a argillite i.e., quartz, common feldspar, sodium feldspar, white mica, calcite, hematite, magnetite, limonite, a sulfide of iron, calcium sulfate, kaolinite, bauxite, calcium carbonate, sodium sulfate, red iron ore, limonite, aluminum sulfate, sodium chloride, sodium hydrogen sulfate, and potassium alum. In addition, salts and moss adhesive rock samples extracted from the Orval Abbey of Belgium, and salts collected from the Yoshimi-hyakua were also measured. In order to examine the possibility of mineral specification by a color spectrum, it is necessary to (1) measure the color of a standard sample, (2) measure the color of the mineral extracted from the field, and (3) identify the mineral by more laboratory-based techniques, such as SEM-EDS and XRD. After the examination, it turned out that the spectrum of the sample extracted from the fields and the spectrum of a corresponding standard sample looked very similar. It is also observed that the color spectrum could better describe a very small quantity difference, rather than the  $L^*a^*b^*$  value. It is concluded that the identification or specification of a mineral using the visible-reflectance spectrum technique is possible. However, there still are many difficulties, such as construction of a database and examination of an error of measurement, to address in order to successfully employ this technique in field.

Keywords: mineral species, visible-reflectance spectrum, color measurement