

CCD Mapping Analysis of Granite

Outline

Granite is one of the acidic plutonic rocks. It is a mineral consisting of quartz, potash feldspar, plagioclase, mica, amphibole, etc. Introduced here is the CCD mapping analysis of this granite by the combined operation of a CCD camera and a sample stage driving mechanism, a new function of the Rigaku X-ray spectrometer system ZSX. In the CCD mapping analysis, elemental analysis can be carried out by designating the actual position for measurement while directly observing the sample surface with the CCD camera self-contained in the spectrometer system. This work was carried out with a 1 mm diameter measuring area.

1. Sample preparation and equipment

1.1 Equipment

Rigaku / Sequential XRF model **ZSX100e**

X-ray tube	: 4kW, End window, Rh target
Sample observation system	: CCD camera
Analytical point positioning	: By sample stage
Analysis area	: 1 mm dia.

1.2 Sample preparation

Prior to measurement, a sample was cut to a size that fits into a sample holder. The sample surface was polished and contaminants were removed. Then, the sample was installed into a dedicated sample holder to go through all measurements.

1.3 Measurement condition

Element	F~Mg	Al, Si	P, S	Cl	K, Ca	Ti~U
kV – mA	30-120	30-120	30-120	30-120	40-90	50-72
Slit	Standard	Standard	Standard	High resol.	Standard	Standard
Crystal	TAP	PET	Ge	Ge	LiF200	LiF200
Detector	F-PC	F-PC	F-PC	F-PC	F-PC	SC
PHA	Diff.	Diff.	Diff.	Diff.	Diff.	Diff.
X-ray path	Vac.	Vac.	Vac.	Vac.	Vac.	Vac.

2. Measurement result

Mapping analysis was conducted for all of the components detected from the qualitative analysis result at 1 mm dia. As shown in the following picture, it was verified that a black section contains lots of magnesium, iron and manganese, a white section contains calcium and sodium and a red part contains potassium, in higher quantities.

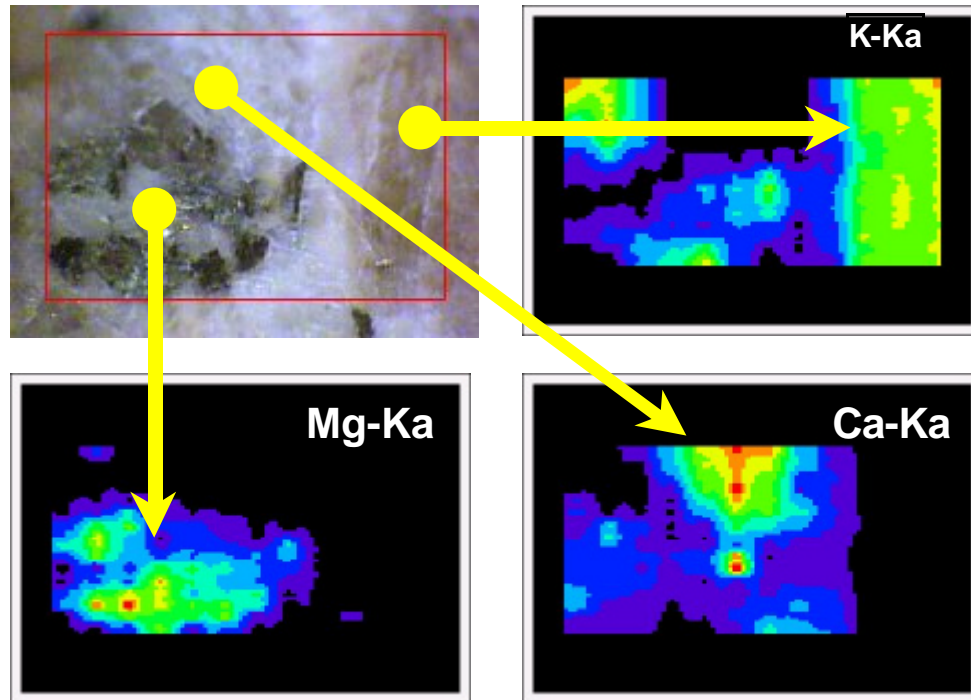


Fig.-1 CCD magnified picture and X-ray distribution of each component
(2-dimensional display)

3. Summary

The CCD mapping analysis enables one to verify the distribution of elements while directly observing the sample. Moreover, it appears possible to identify minerals that are difficult to identify visually.

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