

A new method to evaluate lattice preferred orientation using electron spin resonance

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Electron spin resonance of minerals is useful to know the crystal field around unpaired electrons (ESR centers). A new method is under development to obtain orientation distribution function (ODF) of each mineral in multimineralic rocks. Lattice preferred orientation of some phyllosilicates are successfully observed in magnetically oriented powder samples. The experimental procedure and numerical algorithm will be shown in the presentation to obtain ODF from the experimental data.

Electron spin resonance (ESR) is a method to measure the physical state of unpaired electrons. In case of solid samples, the crystal field around the unpaired electron (ESR centers) can be investigated from the ESR spectra. A new method is under development that is to obtain orientation distribution function (ODF) of each mineral in multimineralic rocks.

Lattice preferred orientation of some phyllosilicates (talc, serpentine, muscovite) are successfully observed in magnetically oriented powder samples. The orientation mechanism is not necessarily the anisotropic susceptibility. This method must be applied to the preferred orientation of minerals in naturally deformed rocks.

Detailed ESR data of the single crystalline minerals should be prepared to obtain the ODF. The experimental procedure and numerical algorithm will be shown in the presentation in order to obtain ODF from the experimental data. Some example data of the rocks will also be shown.