

## Electrical conductivity of crustal rocks and hydrous mineral

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The laboratory measurements of electrical conductivity for rocks and hydrous minerals help us to interpret Electro-Magnetic (EM) soundings. Thus, a large number of researchers have investigated electrical properties of rocks and hydrous minerals experimentally and theoretically. Recent experimental data collected using high pressure and temperatures methods produce clear Arrhenius diagrams of these materials. Particularly, research on conductivity of crustal rocks and minerals are necessary to comprehend physical/chemical conditions within the lower crust. We have performed electrical conductivity measurements on sintered sample, raw rocks and mineral from well-known geological sites. A granulite sample was obtained from Hidaka metamorphic belt, Hokkaido and gneiss and amphibolite were obtained from Higo metamorphic belt, Kyushu. A single crystal brucite collected from Zimbabwe. These rocks and mineral were selected as being representative of mid- to lower crust. Due to detailed geological and petrologic studies, we have knowledge of physical and chemical properties of these materials in these regions. Before conducting electrical conductivity measurements, the insulation of total measurement system was examined. Pressures for measurement are 0.5 - 1 GPa and which represent that of the mid- to lower crust. The temperature range is up to about 1000 K. We utilized sintered homogenous grains of granulite and amphibolite itself for measurements. Though gneiss includes foliations, we have tried to measure electrical conductivity perpendicular and parallel to foliations. As for single crystal brucite, we used single crystal sapphire case to avoid contamination and not react with surrounded materials.

After finishing conductivity measurements, dimensions of samples were measured and the inspections of mineral compositions were conducted by X-ray diffraction analysis EPMA. Consequently, the present work showed that there are some correlations between the result of our experiments and the data from EM observations. We also evaluated the influences of time on results of laboratory measurements of high temperature conductivity. Previous studies have suggested the stability for measurements of high temperature minerals.