

Electrical conductivity measurement of granulite at temperatures to 900K and under pressure to 1 GPa

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In this study, we focus electrical conductivity of granulite of the Hidaka Metamorphic Belt, Hokkaido, Japan. Well-crashed granulite fragments were pressed to about 1 GPa and fired at high temperatures (- 1000K). This process is almost similar conditions of that of Hidaka metamorphic rocks.

The electrical conductivity measurements were conducted using sinusoidal signal from function generator. At the same time, we computed the impedance and capacitance of the sample. Finally, the electrical conductivity of the granulite is calculated from the resistance and dimension of the sample.

In this paper we will report the result of the electrical conductivity of the granulite from laboratory measurements and that of MT transect of Hidaka Metamorphic Belt, Hokkaido.

Wide-band Magnetotelluric (MT) soundings have been carried out in many places in Japan. These results show that anomalous crust structures exist under the Japanese Islands. However, a lack of laboratory measurements of electrical conductivity makes evaluations of the result of these sounding difficult. In particular, the electrical properties of mid-crust and lower crust rocks are unknown. Thus we emphasize the importance and developments of laboratory measurements and MT investigations.

In this study, we focus electrical conductivity of granulite of the Hidaka Metamorphic Belt, Hokkaido, Japan. Well-crashed granulite fragments were pressed to about 1 GPa and fired at high temperatures (- 1000K). This process is almost similar conditions of that of Hidaka metamorphic rocks.

While the multi-anvil high-pressure apparatus of ISEI, Okayama University (UHP-2000/20) can generate the pressure up to about 1 GPa and temperature is increased by nichrome heater, we carry out electrical conductivity measurement of the sample. Six anvils of 15 mm truncations are used and cubed-shaped pressure medium(MgO and BN) were completely insulated from anvils. Temperature was measured by a Cromel - Almel (Ni90+Cr10 - Ni94+Al2+Mn3+Si1) thermocouples.

The electrical conductivity measurements were conducted using sinusoidal signal from function generator. The applied signal amplitude is 1 Vp-p and its frequency is 0.01 Hz. At the same time, we computed the impedance and capacitance of the sample. Finally, the electrical conductivity of the granulite is calculated from the resistance and dimension of the sample.

In this paper we will report the result of the electrical conductivity of the granulite from laboratory measurements and that of MT transect of Hidaka Metamorphic Belt, Hokkaido.