

Thermoelectric and Galvanomagnetic Effects in Nearly
Monocrystalline Graphite Flakes

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A number of nearly monocrystalline flakes of 7 mm long or more was obtained from the so-called kish graphite precipitated in molten iron. After immersing in various acids for the purification, these specimens were washed with running water and were followingly heat treated at 2100°C in flowing freon atmosphere. Fig. 1 reproduces a set of typical magnetic-field dependency curves of Hall coefficient (R_H) and of magnetoresistance ($\Delta\rho(H)/\rho(0)$) at liquid nitrogen temperature, both of which are in agreement with those obtained by Soule for his natural graphite specimen EP-14 showing satisfactory single-crystal nature. It may be added that a X-ray diffraction analysis has proved the structural perfection of this specimen.

For the measurement of thermoelectric force in such small specimens, a special device which enables to produce considerable temperature difference between the both ends has been developed in combination with a d.c. amplification technique.

An example of the preliminary measurements, i.e. the basal-plane thermoelectric power against silver vs. ambient temperature relationship in the range from -190°C to -140°C , is shown in Fig. 2. It has been found that the absolute thermoelectric power of graphite in the basal plane is -2.78 micro-volt/deg at liquid nitrogen temperature and -0.50 micro-volt/deg at room temperature (290°K).

