

## Letters to the Editor

VARIATION OF ELECTRICAL RESISTIVITY OF TITANIUM  
IN THE TEMPERATURE RANGE 77–200 °KŠTEFAN JÁNOŠ\*, LADISLAV KOVÁČ\*, PETER MARKO\*, RADOMÍR MLÝNEK\*\*,  
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The aim of the present paper is to supply more data about the behaviour of the electrical resistivity of titanium in the temperature range 77–200 °K. In previous works [1, 2] values of electrical resistivity are given only for a few temperatures in the range 77–1680 °K. According to more detailed investigations by White and Woods [3] the intrinsic electrical resistivity at temperatures from 15 °K to about 30 °K is proportional to  $T^{3.3}$ . However, the temperature range 77–200 °K was not investigated in detail.

The specimen for this measurement was prepared by Johnson-Matthey Co; laboratory No. S 702, catalog No. JM 430. The length and diameter are 49.5 mm and 3 mm respectively. The specimen contained the following impurities:

Iron	200 ppm
Tin	50 ppm
Aluminium	30 ppm
Copper	20 ppm
Manganese	10 ppm
Silicon	10 ppm
Nickel	8 ppm
Magnesium less than	1 ppm

The ratio of residual resistance to room temperature resistance is  $R_{s2}/R_{295} \times 10^3 = 73.4$ .

The ideal or intrinsic electrical resistivity at 293 °K is  $43.0 \mu\Omega\text{cm}$ . Electrical resistivity measurements were done by using a standard potentiometric method with a galvanometer M 17/3 with  $\sim 6 \times 10^{-8}$  V sensitivity. Measurements

were always done with a current flow of 100 mA in both directions. The electrical resistivity at 4.2 °K was obtained by immersing the specimen in liquid helium. A cryostat used for temperature dependence measurements given in this work is described in paper [4].

Results obtained are plotted in Fig. 1. The electrical resistivity of titanium in the temperature range 77–100 °K is proportional to  $T^{2.20}$ , 110–150 °K to  $T^{1.72}$  and 160–200 °K to  $T^{1.50}$ , respectively. The exponent in the term  $T^n$  is correct to an error of  $\pm 0.02$ .

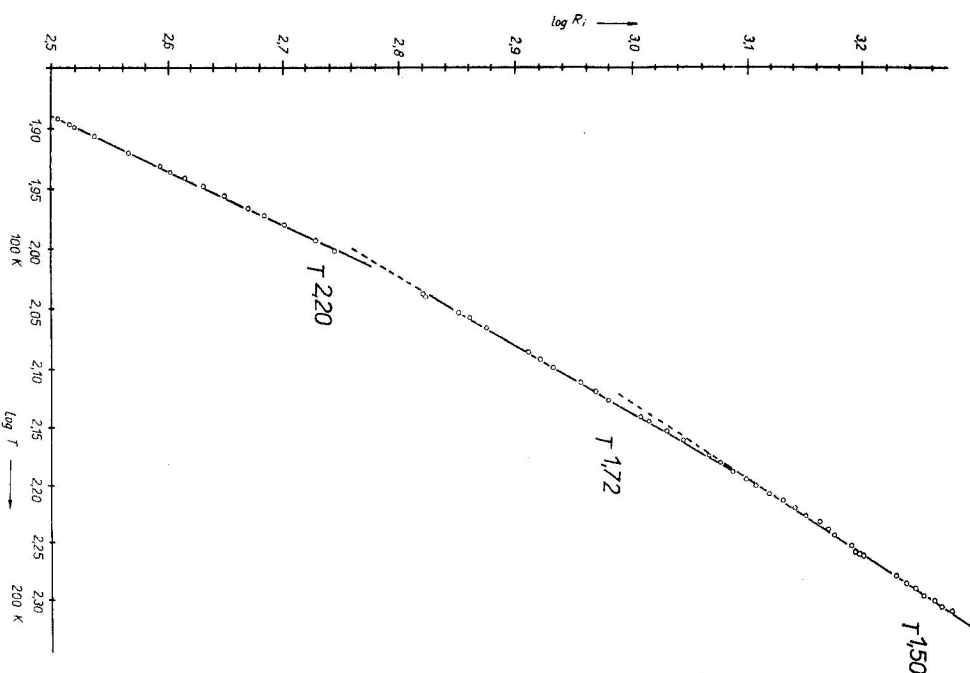


Fig. 1.

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