substance: Ti_2O_3
property: transport properties

figures: resistivity, Seebeck coefficient and Hall coefficient at low temperatures: Figs. 1...3, resistivity and Seebeck coefficient at high temperatures: Figs. 4, 5; magnetoresistance: Fig. 6, conductivity: Fig. 7, piezoresistivity: Fig. 8. The very small band gap implies that intrinsic excitation must play an important role, and all transport parameters at low temperatures have been interpreted in terms of a two-band model. At high temperatures anomalous behaviour of ρ and S has been interpreted as band-crossing phenomenon.

transport parameters at 300 K

σ_n	23...48 Ω^{-1} cm^{-1}	∥ a	73S
	7.8...16 Ω^{-1} cm^{-1}	∥ c	
σ_p	139...163 Ω^{-1} cm^{-1}	∥ a	
	46...54 Ω^{-1} cm^{-1}	∥ c	
μ_n	2.5...7.5 cm^2/V s	∥ a	
	1...2.5 cm^2/V s	∥ c	
μ_p	16...20 cm^2/V s	∥ a	
	5...8 cm^2/V s	∥ c	
σ_n/σ_p	3...7		
n	3.9...5.9·10^{19} cm^{-3}		

The conductivity may also be calculated from the dielectric function by fitting the free-carrier contribution to ε_2 by the formula $\varepsilon_{2,\text{free carrier}} = -(\nu/c)_p^2/(\nu/c)((\nu/c)+iG_p)$, where $(\nu/c)_p$ is the plasma wavenumber and G_p proportional to the reciprocal relaxation time [78L]. For these parameters

$(\nu/c)_p$	2.81·10^3 cm^{-1}	$E \perp c$		78L
G_p	766 cm^{-1}			
$n/(m_n/m_0)$	8.81·10^{19} cm^{-3}		derived from plasma wavenumber	
$\mu_{av}/(m_n/m_0)$	12.2 cm^2/V s		derived from relaxation time	
$(\nu/c)_p$	1.52·10^3 cm^{-1}	$E \parallel c$		
G_p	507 cm^{-1}			
$n/(m_n/m_0)$	2.5·10^{19} cm^{-3}		mean conductivity in a and c	
$\mu_{av}/(m_n/m_0)$	17.4 cm^2/V s		directions calculated from these data is shown in Fig. 7	

References:

61Y Yahia, J., Frederikse, H. P. R.: Phys. Rev. 123 (1961) 1257.
68H Honig, J. M., Reed, T. B.: Phys. Rev. 174 (1968) 1020.
73S Shin, S. H., Chandrashekhar, G. V., Loehman, R. E., Honig, J. M.: Phys. Rev. B8 (1973) 1364.
76C Chen, H. L. S., Sladek, R. J.: Bull. Am. Phys. Soc. 11 (1976) 1355.
78C Chen, H. L. S., Sladek, R. J.: Phys. Rev. B18 (1978) 6824.
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Fig. 1.

Ti_2O_3. Resistivity vs. reciprocal temperature (right scale: resistivity times $T^{-3/2}$) at low temperatures [73S].

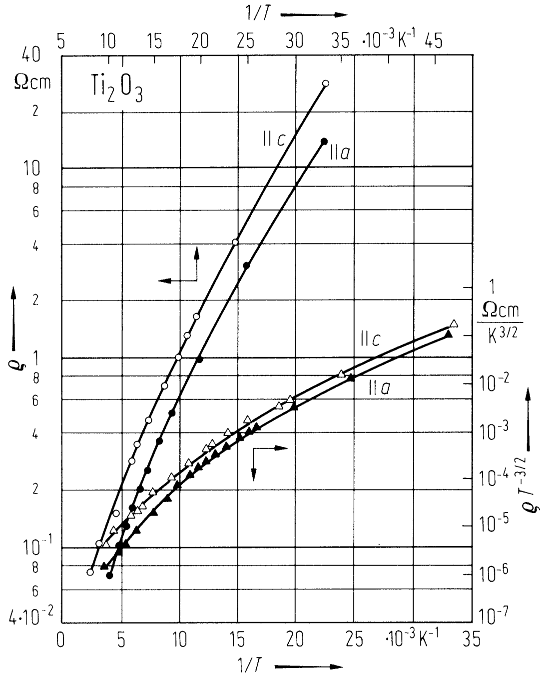

Fig. 2.

Ti_2O_3. Seebeck coefficient vs. temperature for an unoriented and two oriented samples [73S].

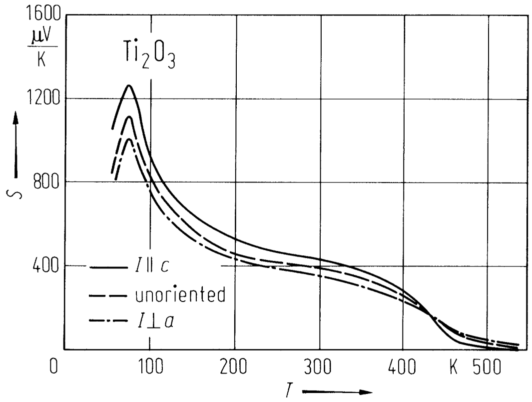

Fig. 3.

Ti_2O_3. Resistivity and Hall coefficient for two crystals vs. reciprocal temperature [61Y]. Orientation not specified.

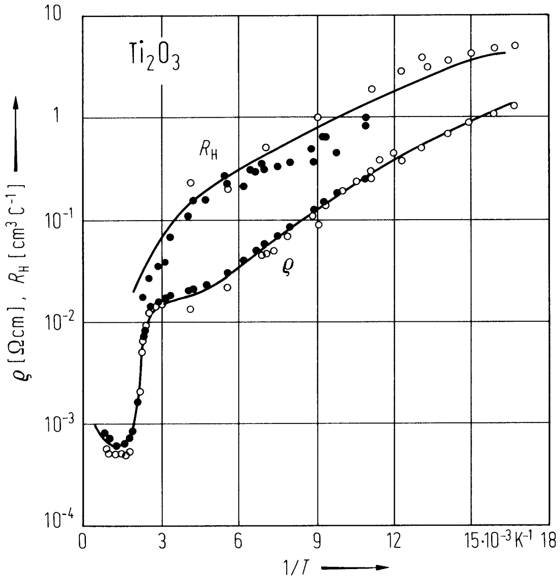

Fig. 4.

Ti_2O_3. Resistivity vs. reciprocal temperature for an unoriented and two oriented samples [73S].

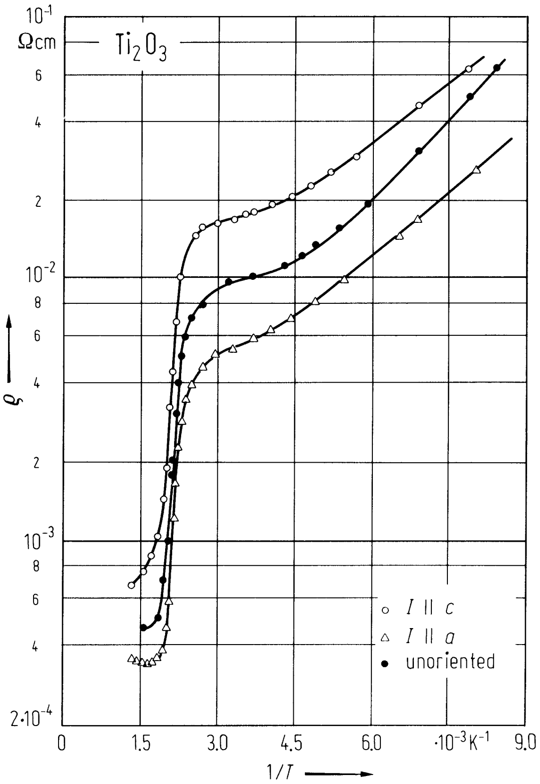

Fig. 5.

Ti_2O_3. Seebeck coefficient vs. temperature above room temperature [61Y]. Orientation not specified.

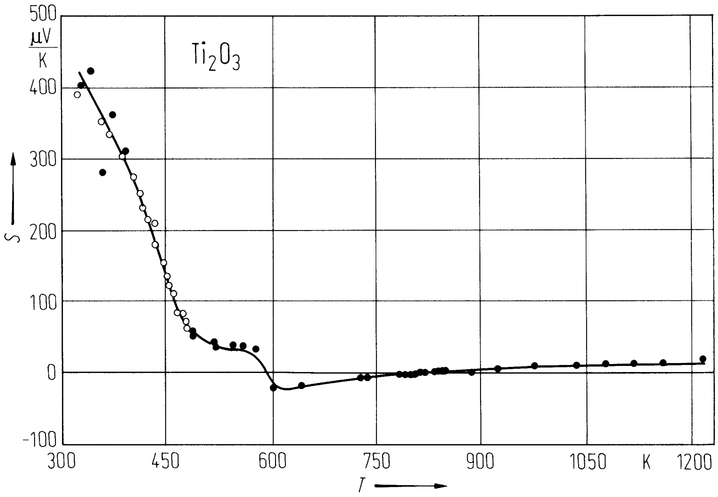

Fig. 6.

Ti_2O_3. Magnetoresistance vs. magnetic induction (lower scale) and square of the magnetic induction (upper scale) for two directions of the current [68H].

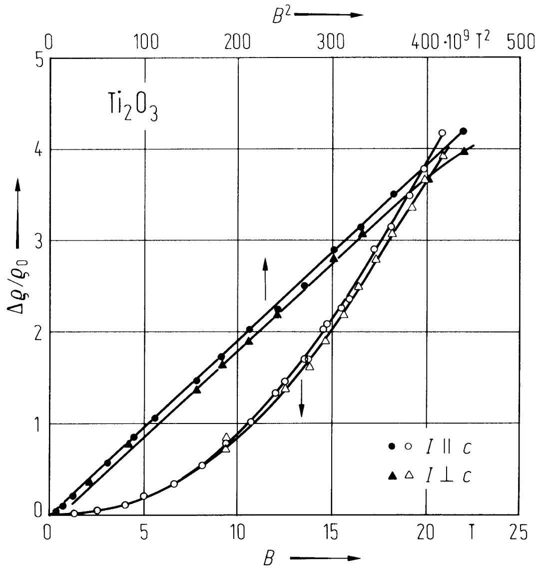

Fig. 7.

Ti_2O_3. Conductivity vs. reciprocal temperature. Full circles: [76C], open circles: [78L].

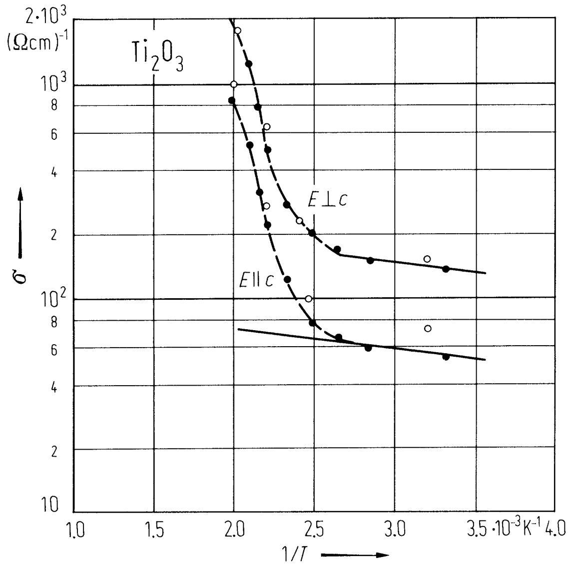

Fig. 8.

Ti_2O_3. Piezoresistance vs. temperature for three directions of the stress along crystallographic directions [78C].