**substance: $V_2O_3$**
**property: transport properties, low-temperature phase, $T < T_{tr}$**

**resistivity**

| | | | | |
|---|---|---|---|---|
| $\rho$ | $0.5 \cdot 10^4$ Ω cm | ∥ *c*, $T$ = 132 K | activation energy 0.12 eV | 67F |
| | $1.3 \cdot 10^4$ Ω cm | ∥ *b*, $T$ = 132 K | activation energy 0.18 eV | |

For stress $X$ the resistivity varies as $\rho(X,T) = A(0) \exp((E+aX)/kT)$ with $a = -1.5 \cdot 10^{-6}$ eV bar$^{-1}$ for uniaxial stress along *b*-axis, = $-1.1 \cdot 10^{-6}$ eV bar$^{-1}$ for hydrostatic pressure [67F].

**variation of the transition temperature with uniaxial stress**

| | | | |
|---|---|---|---|
| $dT_{tr}/dX$ | $-6.8(5) \cdot 10^{-3}$ K bar$^{-1}$ | $X \parallel a$ | 67F |
| | $-4.1(5) \cdot 10^{-3}$ K bar$^{-1}$ | $X \parallel b$ | |
| | $-0.5(5) \cdot 10^{-3}$ K bar$^{-1}$ | $X \parallel c$ | |

**Seebeck coefficient:** Fig. 1. *S* is large and negative.

**Hall data:** No data reported.

**transport properties for $V_2O_{3+x}$:** Fig. 2. No semiconducting phase formed for x ≥ 0.04. Discontinuity in resistivity $\Delta\rho$ is independent of x; $\Delta\rho \approx 10^7$ Ω cm at $T_{tr}$ [80U]. $T_{tr}$ decreases with x (Fig. 3).

**high-temperature transition:** $\rho(T)/\rho(0^{o}C)$ rises anomalously rapidly in the region of 525 K.

**Cr doped material:** Conductivity: Fig. 4, Seebeck coefficient: Fig. 5, conductivity of $(V_{1-x}Cr_x)_2O_{3+y}$, Fig. 6.

**Al doped material:** Conductivity: Fig. 7.

**Ti doped material:** Conductivity: Fig. 8.

## References:


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76K1 Kuwamoto, H., Dickerson, D. L., Keer, H. V., Honig, J. M.: Mater. Res. Bull. 11 (1976) 1301.

76K2 Kuwamoto, H., Keer, H. V., Keem, J. E., Shivashenkar, S., Van Zandt, L. L., Honig, J. M.: J. Phys. 37 (1976) C4-35.

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**Fig. 1.**

$V_2O_3$. Seebeck coefficient vs. temperature for pure and Ti-doped $V_2O_3$. Downward triangles: first cooling, full circles: second cooling, upward triangles: second warming, downward full triangles: 0.1 at% Ti, upward full triangles: 1 at% Ti. A second sample was also investigated, (o) cooling [75K]. Orientation not given.

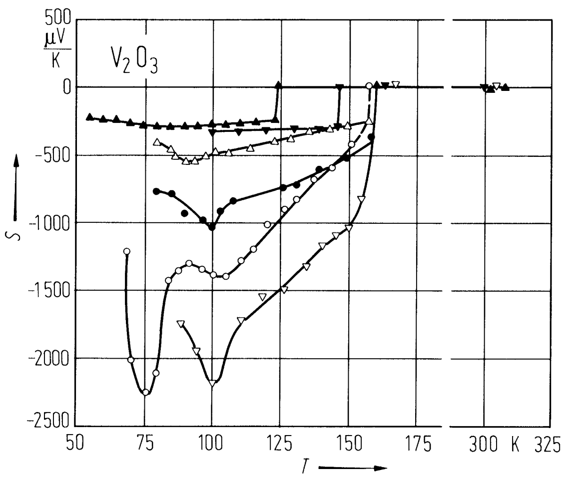

**Fig. 2.**

$V_2O_{3+x}$. Resistivity vs. temperature on cooling [80U]. Orientation not given.

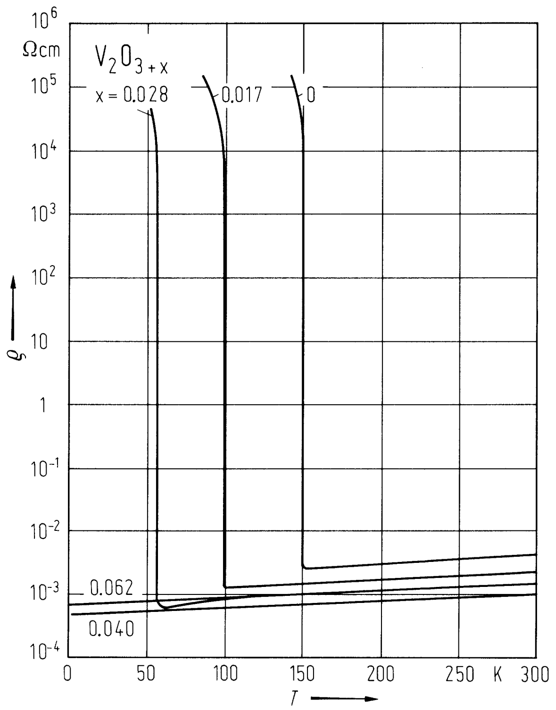

**Fig. 3.**

$V_2O_{3+x}$, $(V_{1-x}Ti_x)_2O_3$. Comparison of activation energy $E_A$ and discontinuity in resistivity ($\Delta\rho$) vs. transition temperature $T_{tr}$ [80U]. $\Delta\rho = \rho(T < T_{tr}) - \rho(T > T_{tr})$.

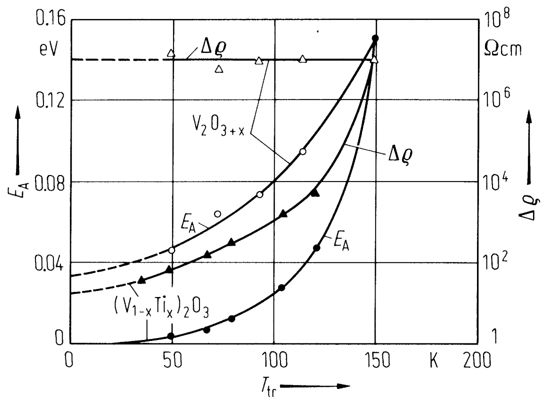

**Fig. 4.**

$(V_{1-x}Cr_x)_2O_3$. Resistivity vs. reciprocal temperature [80K1]. Orientation not given.

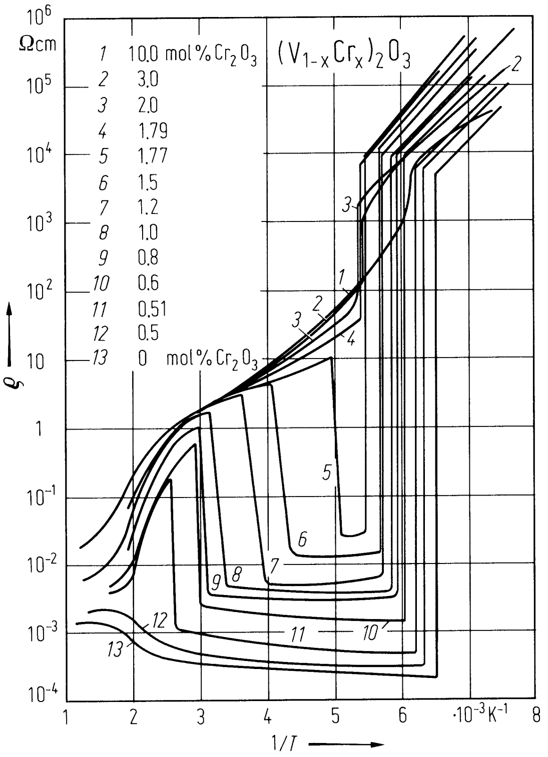

**Fig. 5.**

$(V_{1-x}Cr_x)_2O_3$. Seebeck coefficient vs. temperature [80K1]. Orientation not given.

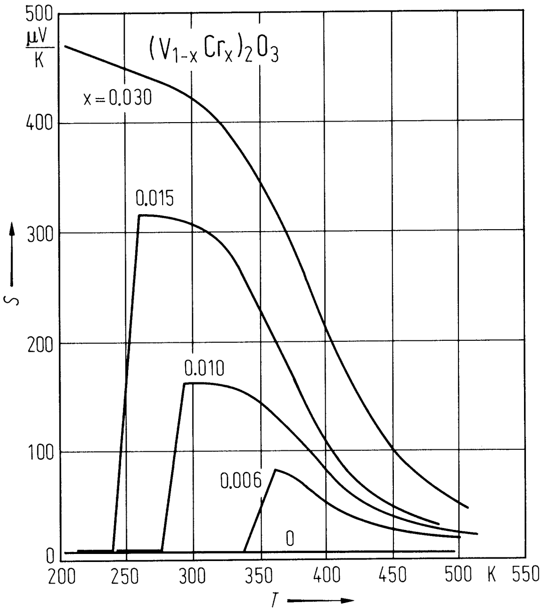

**Fig. 6.**

$(V_{1-x}Cr_x)_2O_{3+y}$. Resistivity vs. reciprocal temperature [80K2]. Orientation not given.

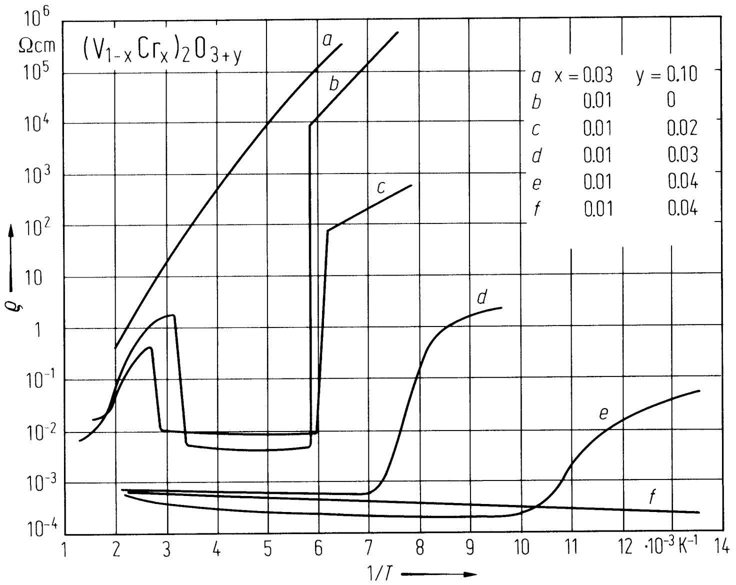

**Fig. 7.**

$(V_{1-x}Al_x)_2O_3$. Electrical resistivity vs. reciprocal temperature for (curve a) x = 0.0033, (b) = 0.011, (c) = 0.02 [76K1]. Orientation not given.

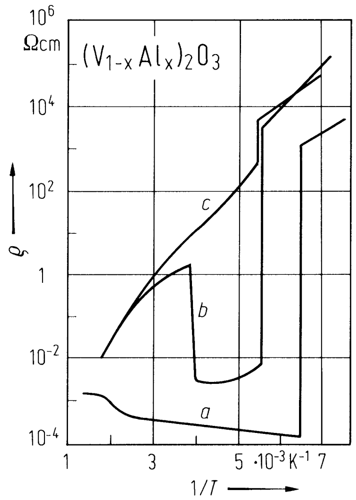

**Fig. 8.**

$(V_{1-x}Ti_x)_2O_3$. Electrical resistivity vs. reciprocal temperature [76K2]. Orientation not given.