substance: NbO_2
property: transport parameters

From [74B]

(A): current parallel to the *a* axis, (B) current in an arbitrary direction perpendicular to the *c* axis, (C) current paralld to the *c* axis. Activation energies E_A in eV.

resistitivy

ρ[Ω cm)	3509	T = 300 K (A)	$E_A(\sigma)$ =	0.44
	22.4	T = 435 K		
	6315	T = 300 K (B)		0.45
	32.5	T = 435 K		
	824	T = 300 K (C)		0.37
	11.6	T = 435 K		

Hall coefficient

R_H [$cm^3\ C^{-1}$]	1377	T = 300 K (A)	$E_A(R_H^{-1})$ =	0.40
	13.6	T = 435 K		
	2543	T = 300 K (B)		0.43
	18.2	T = 435 K		
	517	T = 300 K (C)		0.38
	6.7	T = 435 K		

carrier mobility

μ_H [cm^2/V s]	0.40	T = 300 K (A)	$E_A(\mu_H)$ =	0.035
	0.60	T = 435 K		
	0.40	T = 300 K (B)		0.029
	0.56	T = 435 K		
	0.63	T = 300 K (C)		– 0.007
	0.58	T = 435 K		
μ_{dr} [cm^2/V s]	0.016	T = 300 K (A)	$E_A(\mu_{dr})$ =	017
	0.114	T = 435 K		
	0.009	T = 300 K (B)		0.19
	0.079	T = 435 K		
	0.068	T = 300 K (C)		0.102
	0.22	T = 435 K		
$\mu_H.T^{3/2}$	2045	T = 300 K (A)	$E_A(\mu_H \cdot T^{3/2})$ =	0 083
[$K^{3/2}$ cm^2/Vs]	5365	T = 435 K		
	2084	T = 300 K (B)		0.076
	5027	T = 435 K		
	3270	T = 300 K (C)		0.040
	5181	T = 435 K		

polaron concentration

$n_{polaron}$ [cm^{-3}]	$1.11 \cdot 10^{17}$	T = 300 K (A) (B) (C)	$E_A(n)$ =	0.27
	$2.44 \cdot 10^{18}$	T = 435 K		

thermoelectric power over a wide temperature range is shown in Fig. 1, the crystal used was apparently n-type. From the transport data the conductivity transition is apparently semiconductor-semiconductor in the *a* direction and semiconductor-metal in the *c* direction.

References:

74B Bélanger, G., Destry, I., Perluzzo, G., Raccah, P. M.: Can. J. Phys. 52 (1974) 2272.

Fig. 1.

NbO_2. Seebeck coefficient vs. reciprocal temperature in *a* and *c* direction [74B].