substance: TaS_3
property: crystal structure, physical properties

(S: structure (space group), CG: crystal growth).

(The references in the last column refer to all data of this document)

lattice parameters

a	36.804 Å	T < 210...218 K	S: orthorhombic, $D_2^5 - C222_1$	63A,
b	15.173 Å		semiconductor-metal transition	64B,
c	3.340 Å		at 210...218 K due to Peierls	77S,
			instability (Ta – Ta dimers in chains	78T,
			for $T < T_{tr}$)	79I1
			dT_{tr}/dp = -1.3 K/kbar	
			CG: from elements at 700 ^{0}C in vacuum and slow cooling	

resisitivity

ρ_c	$3 \cdot 10^{-4}$ Ω cm	p-type, synthetic single crystal	

Seebeck coefficient

S_c	21 μV K^{-1}	synthetic single crystal	

energy gap

$E_{g,th}$	0.3 eV	120 < T < 200 K	$dE_{g,th}/dp$ = – 8 K/kbar

Figures to this document:

resistivity: Fig. 1

References:

63A Aslanov, L. A., Simanov, Yu. P., Novoselova, A. V., Ukrainski, Yu. M.: Russ. J. Inorg. Chem. 8 (1963) 1381.

64B Bjerkelund, E., Kjekshus, A.: Z. Anorg. Allg. Chem. 328 (1964) 235.

77S Sambongi, T., Tsutsumi, K., Shiozaki, Y., Yamamoto, M., Yamaya, K., Abe, Y.: Solid State Commun. 22 (1977) 729.

78T Tsutsumi, K., Sambongi, T., Kagoshima, S., Ishiguro, T.: J. Phys. Soc. Jpn. 44 (1978) 1735.

79I1 Ido, M., Tsutsumi, K., Sambongi, T., Mori, N.: Solid State Commun. 29 (1979) 399.

Fig. 1.

TaS_3. Resistance vs. reciprocal temperature at various pressures [79I1].