

substance: PtAs₂

property: physical properties

energy gap

$E_{g,th}$	0.5 eV	from $\log \rho \propto E_g/2kT$, sintered sample	63H
	0.8 eV	from $\log \rho \propto E_g/2kT$	65J
	0.17 eV	$T = 700...1000$ K, sintered sample from $\log \rho \propto E_g/2kT$, $T = 300...500$ K	66B

resistivity: temperature dependence: Fig. 1.

thermoelectric power

S	$-200 \mu V K^{-1}$	$T = 300$ K	sintered sample	63H
	$+310 \mu V K^{-1}$	$T = 295$ K	sintered sample; for temperature dependence, see Fig. 2	65J
	$< 0 \mu V K^{-1}$	$T > 815$ K		

magnetic susceptibility

(in $10^{-6} \text{ cm}^3 \text{ mol}^{-1}$, χ in CGS units)

χ_m	-48	$T = 295$ K	powder	63H
	-45	$T = 77$ K		
	-62	$T = 80$ K	values extrapolated to infinite field,	66B
		$B > 0.8$ T	sintered sample	
	-60	$T = 540$ K		

melting temperature

T_m	> 1533 K	arsenic vapor pressure at this temperature > 1 atm.	65J
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Se doping

PtAs_{1.99}S_{0.01}: $\rho = 8 \cdot 10^{-4} \Omega \text{ cm}$, $S = -54 \mu V K^{-1}$ at RT [65J].

metal substitutions

Ni_xPt_{1-x}As₂: $x \approx 0$ at 1023 K and 1373 K [66B].

Pd_xPt_{1-x}As₂: $x \approx 0$ at 1023 K, $x \approx 0.2$ at 1373 K, $x \approx 0.5$ at 1473 K [66B].

Comparative tables on structural data of transition metal dipnictides:

structure, chemical bond: see document ,

crystallographical data of compounds with octahedrally coordinated cations, see document

interatomic distances in pyrite- and pararammelsbergite-type compounds, see document .

References:

- 63H Hulliger, F.: Nature (London) 200 (1963) 1064.
- 65J Johnston, W. D., Miller, R. C., Damon, D. H.: J. Less-Common Met. 8 (1965) 272.
- 66B Bennett, S. L., Heyding, R. D.: Can. J. Chem. 44 (1966) 3017.

Fig. 1.

PtP₂, PtAs₂, PtSb₂, PtBi₂. Resistivity vs. reciprocal temperature [65J]. The data for semimetallic pyrite-type PtBi₂ (h) are added for comparison. PtP₂: hot-pressed sample; PtAs₂ and PtBi₂: sintered samples; PtSb₂: open triangles - polycrystalline sample, full triangles - single crystals. The broken curve shows the measurements of [66B] on a sintered PtAs₂ sample.

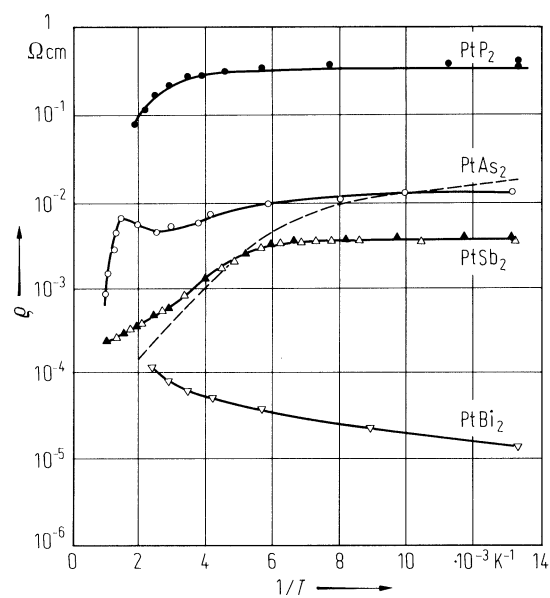


Fig. 2.

PtP₂, PtAs₂, PtSb₂, PtBi₂. Thermoelectric power vs. temperature [65J]. PtSb₂: open triangles- polycrystalline sample, full triangles-single crystal; PtBi₂: pyrite-type high-temperature modification.

