substance: $FeSi_2$
property: phase transitions, Debye temperature, heat capacity, density

phase transition: Figs. 1, 2.

decomposition temperatures (peritectic temperature)

(compare phase diagram, Fig. 3)

T_{dec}	1223 K			59S, 60S
	1200 K			68B
	1259 K			68P
	1250 K			71U
	1260 K		from resistivity jump	73N
	1253 K		for $Fe_{0.97}Mn_{0.03}Si_2$	
	1218 K		for $Fe_{0.94}Mn_{0.06}Si_2$	

Debye temperature

Θ_D	630 K	T = 0 K	from heat capacity $c_p(T)$	73W

heat capacity: Fig. 4.

density

d	4.93 g cm^{-3}	RT	pycnometric	71D
	4.94 g cm^{-3}	RT	X-ray density	71D

References:

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60S Sidorenko, F. A., Geld, P. V., Shumilov, M. A.: Fiz. Metal. Metalloved. 9 (1960) 861 (translation: Phys. Met. Metallogr. 9, Nr. 6 (1960) 56).

68B Birkholz, U., Schelm, J.: Phys. Status Solidi 27 (1968) 413.

68P Piton, J. P., Fay, M. F.: C. R. Acad. Sci., Paris 266C (1968) 514.

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71U Ugai, Ya. A., Ivanova, T. V., Inozemtseva, V. P.: Izv. Akad. Nauk SSSR, Neorg. Mater. 7 (1971) 1983 (translation: Inorg. Mater. 7 (1971) 1766).

73N Nishida, I.: Phys. Rev. B17 (1973) 2710.

73W Waldecker, G., Meinhold, H., Birkholz, U.: Phys. Status Solidi (a) 15 (1973) 143.

Fig. 1.

$FeSi_2$. Electrical conductivity vs. reciprocal temperature [69B]. Semiconductor-metal transition in a nominally stoichiometric polycrystalline sample (50.15 wt% Si). Comparison with the decomposition product below T_{tr}.

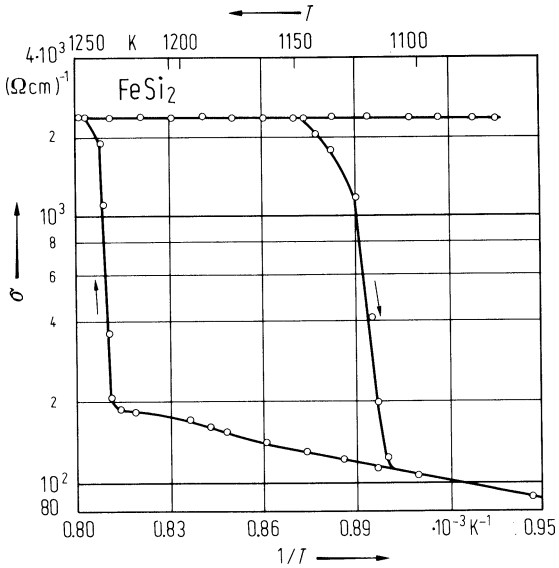

Fig. 2.

$Fe_{0.955}Si_2$. Electrical conductivity vs. reciprocal temperature [69B]. Semiconductor-metal transition in an iron-deficient polycrystalline sample (51.3 wt% Si). Comparison with the decomposition product below T_{tr}.

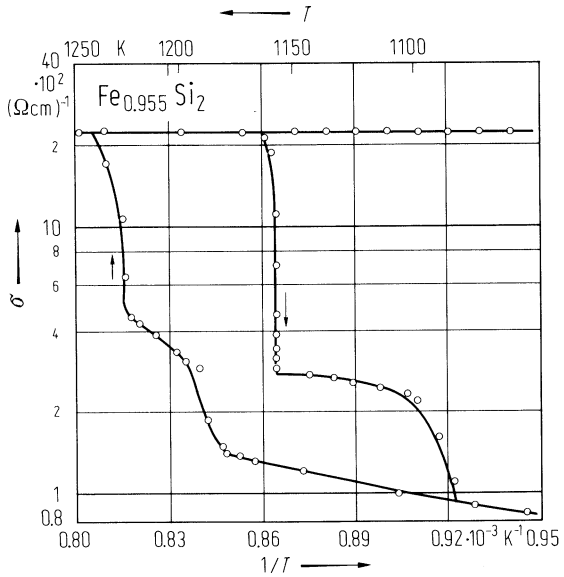

Fig. 3.

Fe–Si. Phase diagram near $FeSi_2$ [68P]. *a* refers to the high-temperature phase $Fe_{\approx 0.8}Si_2$ often designated α-$FeSi_2$.

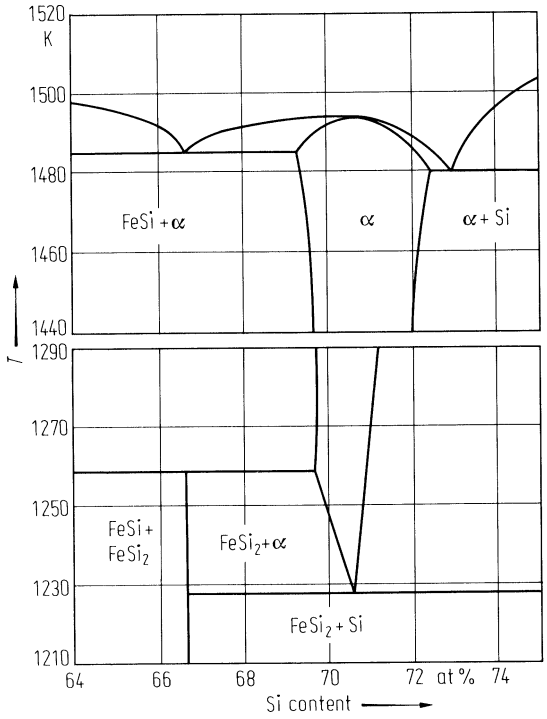

Fig. 4.

$FeSi_2$. Heat capacity vs. temperature [73W]. Full curve: measurements of Krentsis, Gel'd and Kalishevich (1963); Broken curve: measurements of Maglic and Parrot (1970).