substance: $Ni_{1-x}S$
property: crystal structure, physical properties

$Ni_{1-x}S$ ($0 \leq x \leq 0.06$)

(S: structure (space group), CG: crystal growth (the numbers in parentheses correspond to T_1 and T_2, the temperatures (in ^oC) of the hot and cold end of the crystal growth tube, respectively), C: colour).

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

lattice parameters

a, *c*	see Fig. 3	x = 0, quenched from $T > 620$ K;	S: B8, $D_{6h}^4 - P6_3/mmc$ CG: halogen transport (720/650) slowly cooled to 550°C and quenched C: golden yellow	59L, 62K, 63S,

resistivity, Seebeck coefficient

	10^{-4} Ω cm	n-type synthetic single crystal		64K,
$S_\perp$	-3 μV K^{-1}			65H, 67S, 68S1, 68S2, 70O1, 70O2, 71H, 71T, 72K,

Hall mobility, Hall coefficient, carrier concentrations

$\mu_{H\perp}$	1...5 cm^2/V s		Semiconductor-metal transition at	72M
$R_{H\perp}$	-10^{-4} cm^3/C		T_{tr} = 265 K, accompanied by	73K
n	$4 \cdot 10^{22}$ cm^{-3}		antiferromagnetic-paramagnetic	
p	$2 \cdot 10^{20}$ cm^{-3}	($T < T_{tr}$)	transition. T_{tr} depends on x and	74B,
$\mu_{H\perp}$	1...5 cm^2/V s	($T < T_{tr}$)	*p*, it disappears for x > 0.035	74C,
			and $p > 20$ kbar.	74M,
			Latent heat = 282 cal/mol	76B, 76C

Figures to this document:

phase diagrams: Figs. 1, 4

transition temperatures: Fig. 2

lattice parameter: Fig. 3

resistivity, magnetic susceptibility: Fig. 5

Hall coefficient: Fig. 6

energy bands: Fig. 7

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Fig. 1.

Ni – S. Phase diagram. Vapour is present in all assemblages, and the pressure of the system is not constant [64K].

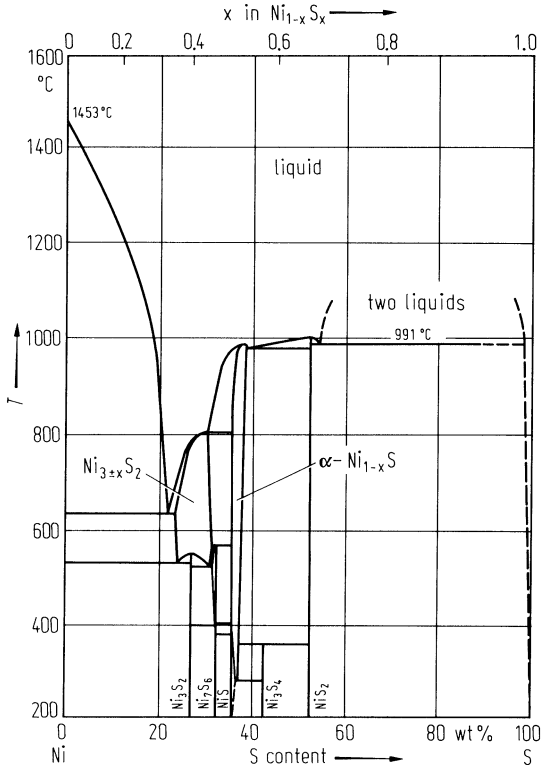

Fig. 2.

$Ni_{1-x}S$. Variation of the first-order transition temperature with stoichiometry. Phase I is an antiferromagnetic semimetal, phase II is a Pauli-paramagnetic metal [76C].

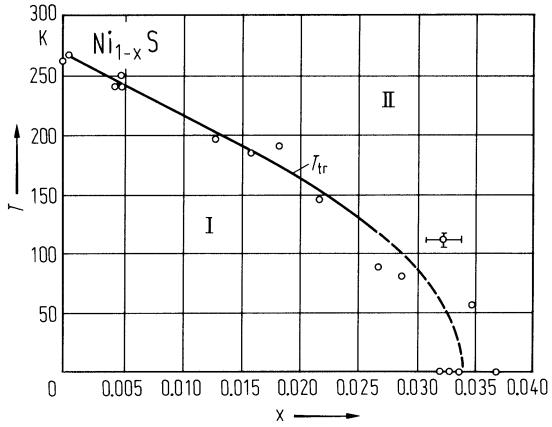

Fig. 3.

$Ni_{1-x}S$ (x unspecified) and 0.2...0.02% Fe impurity. Lattice parameters vs. temperature [63S].

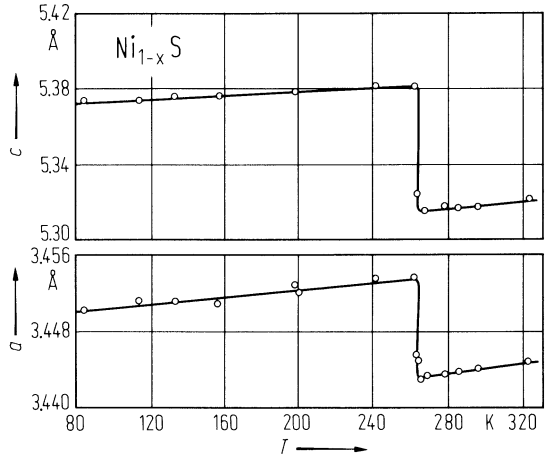

Fig. 4.

NiS. Pressure-temperature phase diagram. Open and full symbols are for increasing and decreasing temperature or pressure. Circles are samples with T_N = 230 K at 1 atm and triangles are for samples with T_N = 210 K [72M].

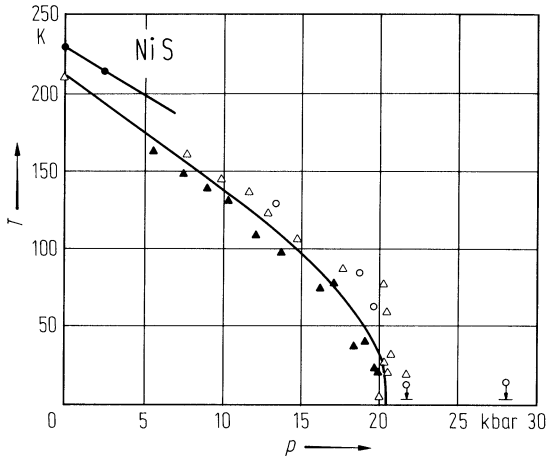

Fig. 5.

NiS. Resistivity (a) and magnetic susceptibility (b) of a stoichiometric crystal of hexagonal NiS vs. temperature [74C].

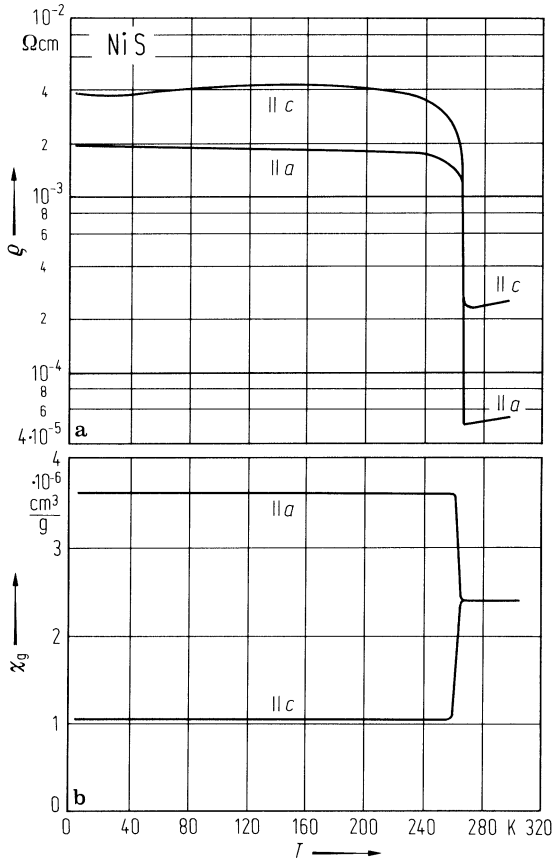

Fig. 6.

NiS. Hall coefficient vs. temperature for a B8-phase single crystal [76B]. $B \parallel c$.

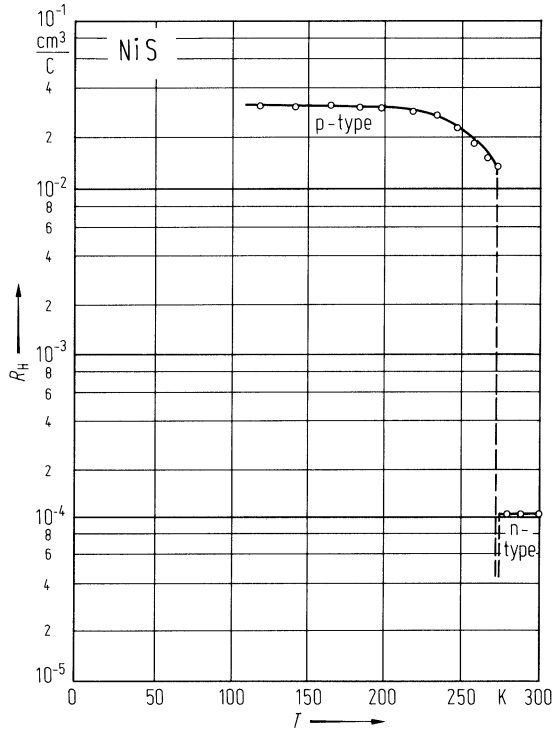

Fig. 7.

NiS. Comparison of nonmagnetic and antiferromagnetic energy bands near the Fermi energy. The nonmagnetic states are labelled using the D_{3d}^3 space-group representations rather than those for D_{6h}^4 space group [74M].