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

$Fe_{1-x}S$ (0 < x < 0.055)

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

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

lattice parameters

a	5.964 Å	x ≈ 0,	S: hexagonal, D_{3h}^4 – $P\bar{6}2c$,	65B,
c	11.744 Å	T = 300 K < T_α	$T < T_\alpha$ = 413 K(x ≈ 0)	56K1,
			see Fig. 4; orthorhombic, B31,	56K2,
			D_{2h}^{16} – Pmcn, $T_\alpha < T < T_s$	57H,
			hexagonal. B8, D_{6h}^4 – $P6_3mmc$,	58M,
			$T > T_s$	60A,
			CG: Bridgman method	61F,
			C: golden yellow	61M,

resistivity, Seebeck coefficient

$\rho_\perp$	10^{-1} Ω cm, x = 0.006 p-type,	antiferromagnetic, T_N = 600 K,	64B,
$S_\perp$	15 cm^2/V s, x = 0.025 synthetic	p_{eff} = 5.5 μ_B, Θ_p = – 1160 K.	64K,
$S_\parallel$	50 μV K^{-1}, x = 0.025 single	Spin-flip transition at T_s = 420K.	65B,
	260 μV K^{-1}, x = 0.006 crystal	dT_N/dp = 3.2 K/kbar	68M,

Hall coefficient, carrier mobility, hole concentration

R_H	$0.7 \cdot 10^{-4}$ cm^3/C	$R_{H\parallel} = R_{H\perp}$		70D,
p	$8.5 \cdot 10^{22}$ cm^{-3}			71N,
$\mu_{H\parallel}$	$2.8 \cdot 10^{-4}$ cm^2/V s			73T,
	0.21 cm^2/V s	T = 150°C		74A,
$\mu_{H\perp}$	0.16 cm^2/V s			76C,
$\mu_{p\perp}$	0.16 cm^2/V s		from Seebeck and resistivity data	76H,
				76M,
				78W

Figures to this document:

phase diagram: Fig. 1

clusters: Fig. 2

magnetic susceptibility: Fig. 3

resistivity: Fig. 4

Seebeck coefficient: Fig. 5

References:

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Fig. 1.

Fe_xS. (a) T_α and T_s vs. composition (different symbols correspond to different measurements) [76H], (b) phase diagram of the FeS – Fe_7S_8 system (the inserts show two possible phase relations, see original paper) [71N], (c) phase diagram of the Fe – S system [64K].

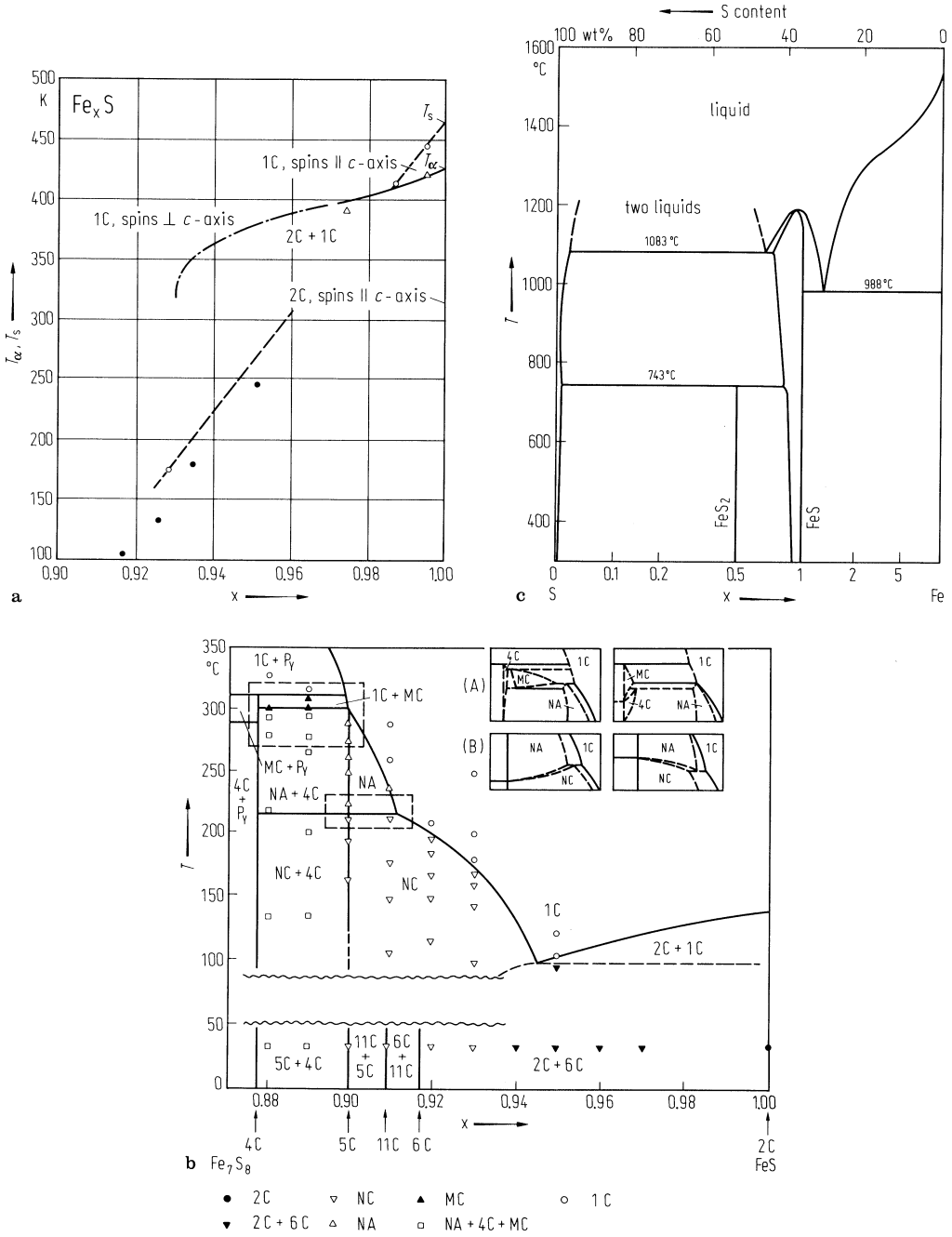

Fig. 2.

FeS. Displacement of Fe atoms to form triangular clusters at low temperatures [64B].

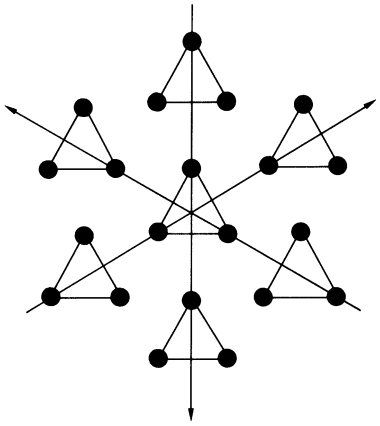

Fig. 3.

$Fe_{0.996}S$. Magnetic susceptibility vs. temperature of a single crystal [76H].

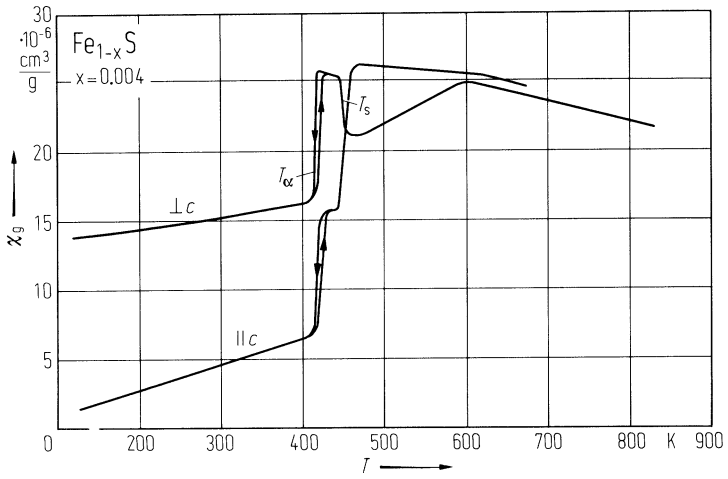

Fig. 4.

$Fe_{1-x}S$. (a) Electrical resistivity $\rho_{4\perp}$ vs. temperature (curve with x = 0.0146 represents the values of the second heating cycle), (b) electrical resistivity $\rho_{4\perp}$ vs. reciprocal temperature [76M]. Four-probe measuring cell. The four electrodes are placed in the centre of a crystal surface $\perp c$. $R_{4\perp}$ then results from the voltage drop between the inner electrodes and current *I*.

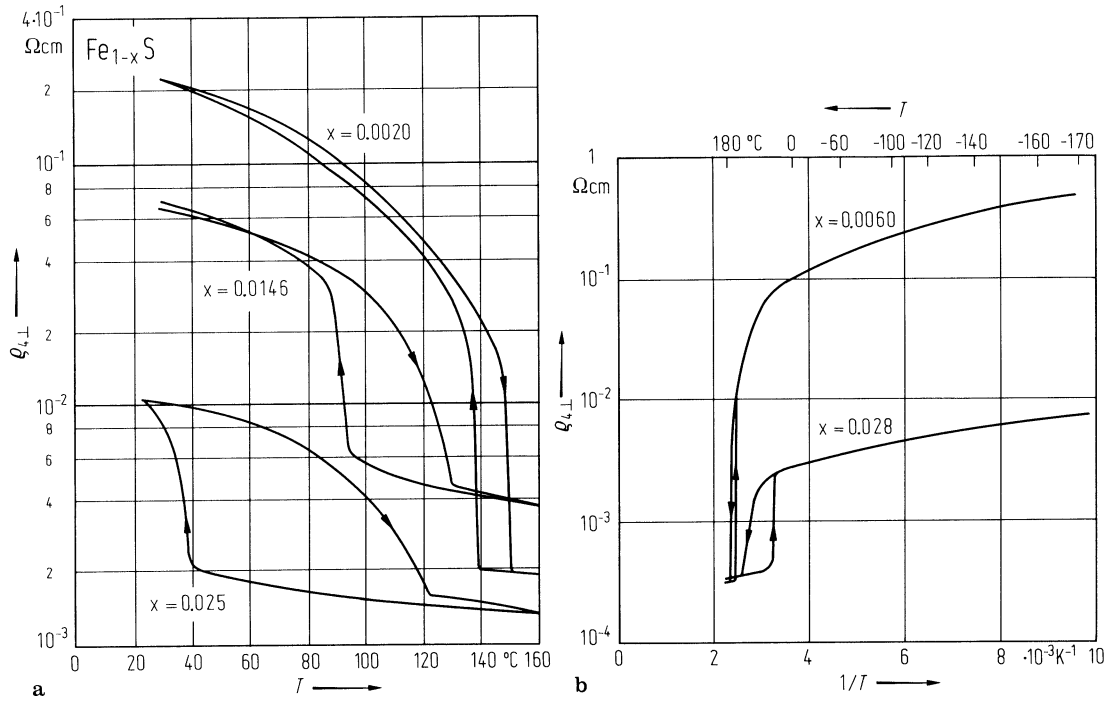

Fig. 5.

$Fe_{1-x}S$. Seebeck coefficient vs. temperature [76M].