substance: $CrSi_2$
property: transport properties

resistivities
(in $10^{-4}\ \Omega$ cm)

(see Figs. 1 and 2)

ρ	≈ 10	RT	highly degenerate p-type region	64S, 72N, 78N
	1.9 exp(1740/T)	T > 700 K	hot-pressed bar, intrinsic region	78N
$\rho_\parallel$	3.0 exp(1850/T)	T > 700 K, along [0 0 1]	intrinsic region; dc method	72N
$\rho_\perp$	l.6 exp(1850/T)	T > 700 K	intrinsic region	72N

Hall effect, thermoelectric power, Nernst-Ettingshausen effect and thermal conductivity: Figs. 3...9

carrier mobilities

(see also Figs. 11...13)

μ_n	0.27 cm^2/V s	RT		73N
μ_p	8 cm^2/V s	RT		73N
	$7.0 \cdot 10^4\ T^{-3/2}$ cm^2/V s	T = 300...1200 K	Hall mobility R_H/ρ	78N

mobility ratio

b	0.035	RT		73N
	0.01		derived from extrinsic/ intrinsic resistivities	78N

thermal conductivity

κ	0.071 W cm^{-1} K^{-1}	RT		60N

anisotropy of resistivity, mobility, thermoelectric power and thermal conductivity

$\rho_\parallel/\rho_\perp$	1.9		roughly constant below 700 K, decreases at higher temperature	72N
	1.5...1.7	RT		67V

no anisotropy of the Hall coefficient at 100...500 K [70K], 85...1100 K [72N].

$S_\parallel/S_\perp$	1.7	RT	for the temperature range	67V
	1.3		100...1100 K, see Figs. 7, 8. No variation of $S_\parallel - S_\perp$ with carrier concentration for samples with ρ = 0.09...0.3 mΩ cm [67V].	
$\kappa_\parallel/\kappa_\perp$	1.2	RT	for the temperature range 300...950 K, see Fig. 10	67V

anisotropy of Hall mobility: Fig. 13, mobility ratio $b_\parallel << b_\perp = 0.01$ [72N].

hole concentration

p	$6.2 \cdot 10^{20}$ cm^{-3}	*T* = 85...600 K	from Hall effect in 0.5...6.5 kG (degenerate semiconductor)	72N
	$4 \cdot 10^{20}$ cm^{-3}	*T* = 90...500 K, undoped sample	from Hall effect in 5 kG, *p* decreases with excess Si (compare Fig. 3)	64S
	$7.7 \cdot 10^{20}$ cm^{-3}	RT, pure $CrSi_2$		78N

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64S Shinoda, D., Asanabe, S., Sasaki, Y.: J. Phys. Soc. Jpn. 19 (1964) 269.

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Fig. 1.

$CrSi_{2+\delta}$ and $Cr_{0.88}Mn_{0.12}Si_2$. Resistivity vs. reciprocal temperature [64S]. *1*: $CrSi_2$ (single crystal of unknown orientation), *2*: $CrSi_{2.01}$ (polycrystalline), *3*: $CrSi_{2.02}$ (polycrystalline), *4*: $Cr_{0.88}$ $Mn_{0.12}Si_2$ (crystal grown by the Bridgman technique).

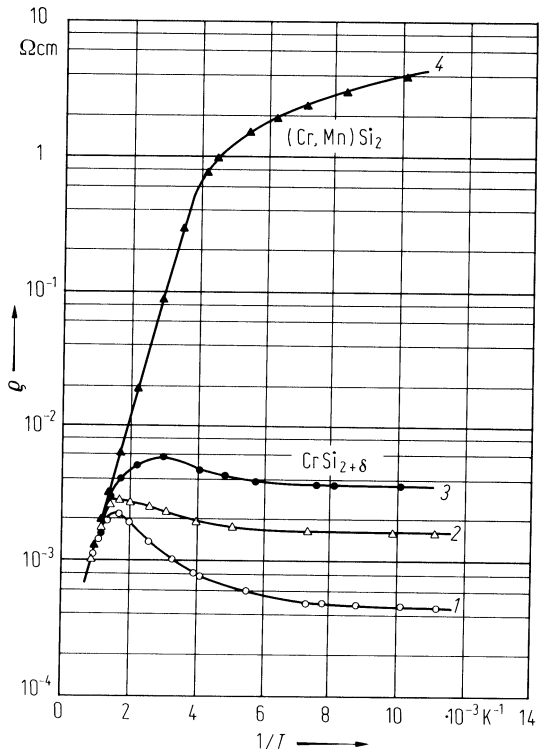

Fig. 2.

$Cr_{1-x}Mn_xSi_2$. Resistivity vs. reciprocal temperature for hot-pressed samples annealed at 1373 K [78N]. Mn concentration (in parentheses) in 10^{21} cm^{-3}. *1*: x = 0, *2*: x = 0.059 (1.65), *3*: x = 0.100 (2.80), *4*: x = 0.115 (3.23), *5*: x = 0.142 (3.99), *6*: x = 0.182 (5.12).

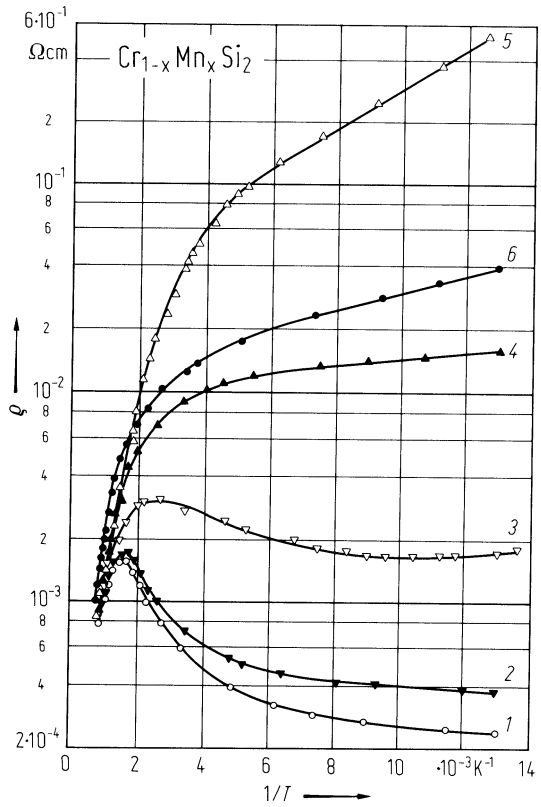

Fig. 3.

$CrSi_{2+\delta}$ and $Cr_{0.88}Mn_{0.12}Si_2$. Hall coefficient vs. reciprocal temperature [64S]. Symbols as in Fig. 1.

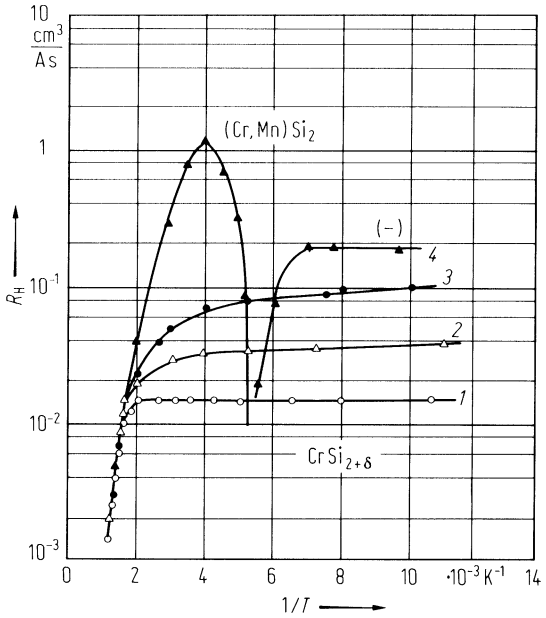

Fig. 4.

$Cr_{1-x}Mn_xSi_2$. Hall coefficient vs. reciprocal temperature [78N]. Mn concentrations as in Fig. 2.

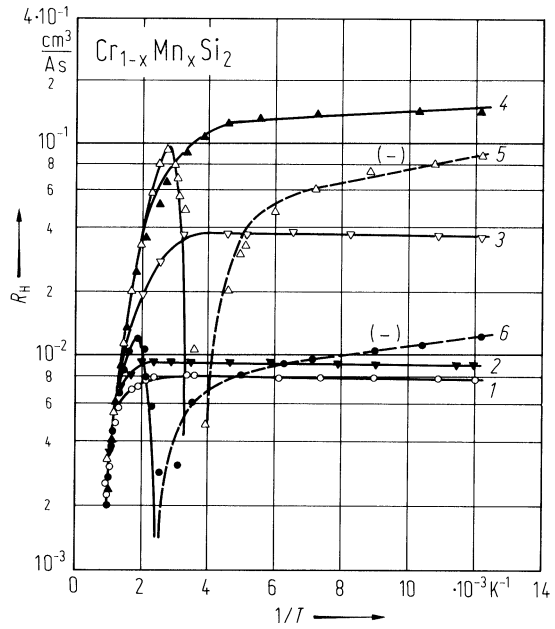

Fig. 5.

$CrSi_{2+\delta}$ and $Cr_{0.88}Mn_{0.12}Si_2$. Thermoelectric power vs. temperature [64S]. The solid curves are calculated. Symbols as in Fig. 1.

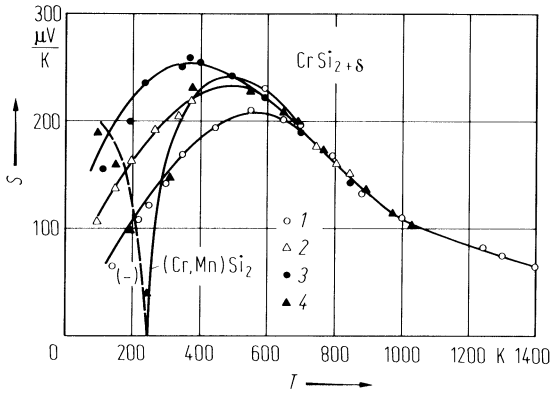

Fig. 6.

$Cr_{1-x}Mn_xSi_2$. Seebeck coefficient *S* vs. temperature [78N]. Mn concentrations as in Fig. 2. Solid and dashed curves are calculated for acoustic lattice scattering and for impurity ion scattering, respectively.

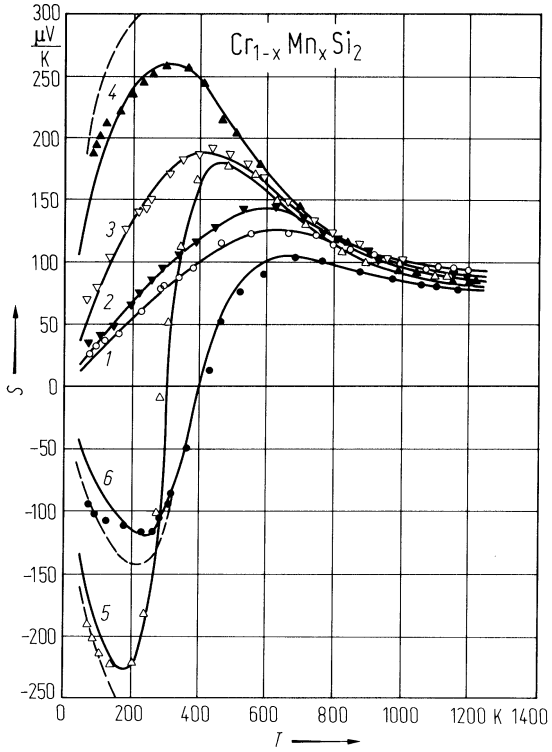

Fig. 7.

$CrSi_2$. Anisotropic Seebeck coefficient vs. temperature [72N]. The solid curves are calculated with the mobility ratio $b = 0$, while the dotted curves are calculated with $b = 0.01$. Compare [72V].

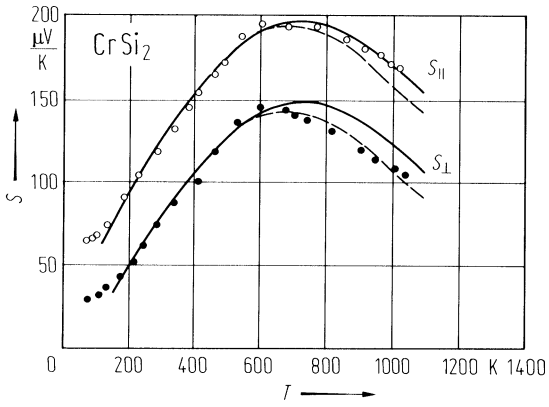

Fig. 8.

$CrSi_2$. Anisotropy of the thermoelectric power vs. temperature [72N]. The sample contained 66.43 % Si.

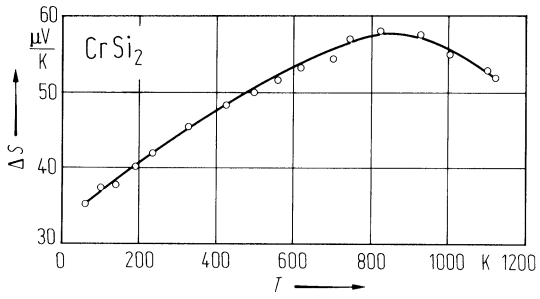

Fig. 9.

$CrSi_2$. Nernst coefficient B vs. temperature [70K]. Curve*1*: B_{aca}, *2*: B_{aac}.

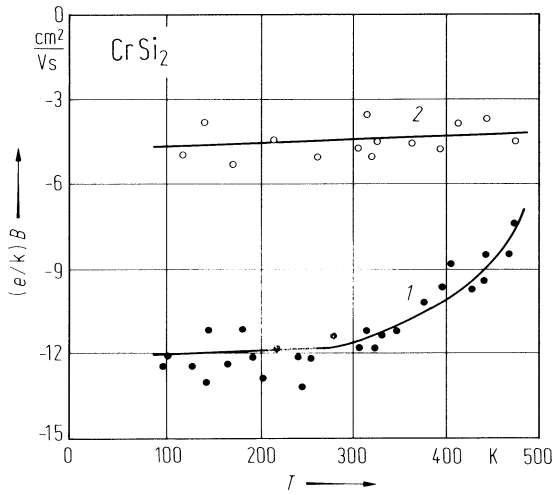

Fig. 10.

$CrSi_2$. Thermal conductivity vs. temperature [72V]. Full curves: total thermal conductivity; broken curves: lattice contribution. ∥: parallel to the *c* axis; ⊥: perpendicular to the *c* axis.

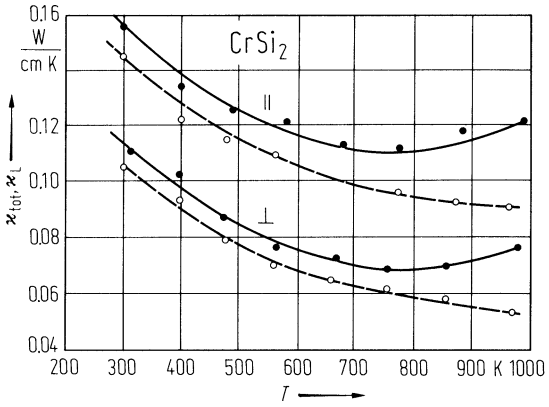

Fig. 11.

$CrSi_{2+\delta}$ and $Cr_{0.88}Mn_{0.12}Si_2$. Hall mobility of holes vs. temperature in a doubly-logarithmic scale [64S]. Symbols as in Fig. 1.

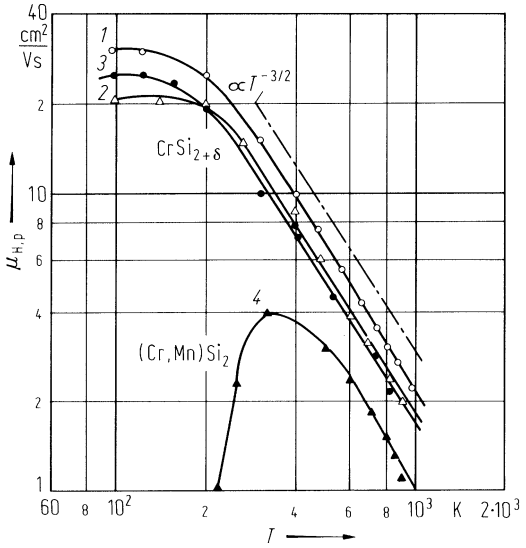

Fig. 12.

$Cr_{1-x}Mn_xSi_2$. Hall mobilities vs. reciprocal temperature in a doubly-logarithmic scale [78N]. Mn concentrations as in Fig. 2. Samples are hot-pressed at 1473 K and annealed at 1373 K.

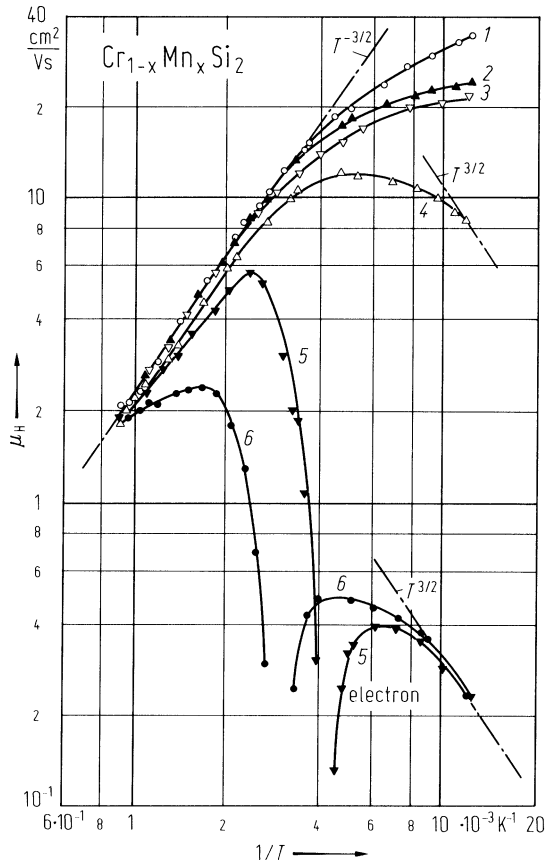

Fig. 13.

$CrSi_2$. Hall mobility of holes vs. reciprocal temperature in a doubly-logarithmic scale [72N]. $\mu_{\parallel}$: along the *c* axis, $\mu_{\perp}$: along the *a* axis.