

Fig. 107. FeSn₂. Antiferromagnetic structure proposed to explain both Mössbauer-spectroscopy [85L1, 87V2] and neutron- powder-diffraction [85V1] data. Projections onto tetragonal *c* plane. The Fe magnetic moments at *z* = 1/4 and 3/4 are parallel to each other and stay in the *c* plane. **(a)** Collinear structure between *T_N* = 378 K and *T_{tr}* = 93 K. The Fe moments, which are oriented along <100> (± [010] are chosen in the figure) at *T_N* (β = 45°), rotate continuously by 19° (β = 26°) with decreasing temperature. **(b)** Noncollinear structure below *T_{tr}*. Hyperfine-field directions at Sn (at *z* = 0 and at *z* = 1/2) are also shown. Magnetic unit cell becomes twice as large as chemical cell: *a_{mag}* = √2 *a*. From a line (in the *c* plane) which makes an angle β with *a_{mag}* ([110] of chemical cell), Fe moments deviate by α leading to a sequence of canting angles {β + α, π + β - α} from ± *a_{mag}*. With decreasing temperature, β decreases from 26° to ≈ 0° while α increases from 0° to 28° [87V2].

1.5.4.6 Co and Ni alloys and compounds

Antiferromagnetism is induced in a Co-Ge compound by Mn substitution.

Survey

	Composition x	Properties	Figure	Table
Co _{7-x} Mn _x Ge ₆	3.25	σ(<i>T</i>), χ _g ⁻¹ (<i>T</i>)	109	
	2.25...3.5	<i>T_N</i> (<i>x</i>), Θ(<i>x</i>)	110	
CoGe ₄ ¹⁾		<i>a</i> , χ _g		6

¹⁾ High-pressure synthesized compound.

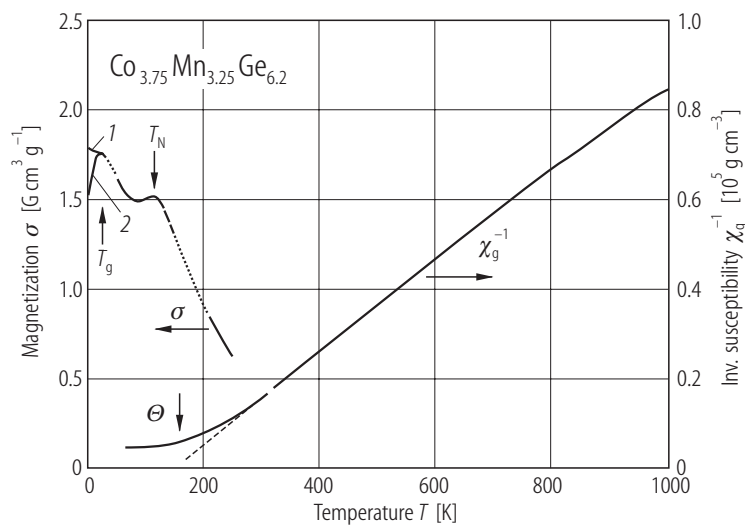


Fig. 109. $\text{Co}_{3.75}\text{Mn}_{3.25}\text{Ge}_{6.2}$. Temperature dependence of the mass magnetization σ in a magnetic field $H = 9.0$ kOe, as well as the inverse magnetic mass

susceptibility χ_g^{-1} . Measurements were carried out on heating, after cooling from 80 K to 4.2 K (1) in a field of 9.5 kOe and (2) in zero field [92H1].

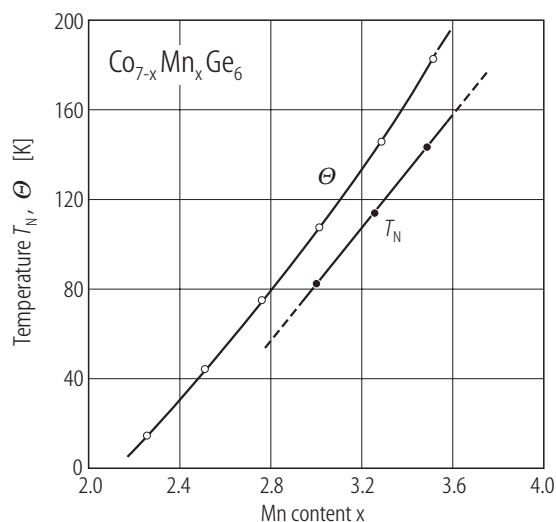


Fig. 110. $\text{Co}_{7-x}\text{Mn}_x\text{Ge}_6$. Composition dependence of Néel temperature T_N and the paramagnetic Curie temperature Θ [92H1].

1.5.4.7 MM'X ternary compounds

The investigations on the ternary $\text{MM}'\text{X}$ compounds or on the related $\text{MM}'\text{X}_{1-x}\text{X}'_x$ compounds, where M and M' are different 3d elements and X and X' 4B element, include the effect of pressure on the magnetism of the pure Mn compounds.