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(Tu-P-20) SPINGLASS BEHAVIOUR OF $Zn_{1-x}Mn_xSe$ AND $Zn_{1-x}Mn_xTe$ BELOW PERCOLATION LIMIT*

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Spinglass phase transition is reported in $Zn_{1-x}Mn_xSe$ and $Zn_{1-x}Mn_xTe$ for x below percolation limit.

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The magnetic susceptibility of $Zn_{1-x}Mn_xSe$ ($0.02 \leqslant x \leqslant 0.53$) and $Zn_{1-x}Mn_xTe$ ($0.07 \leqslant x \leqslant 0.21$) was investigated in the temperature range 10 mK $\leqslant T \leqslant$ 40 K. A paramagnetic spinglass transition was observed in the whole temperature range (Fig. 1). The concentration dependence of the freezing temperature T_f was found to be compatible with a radial dependence of the exchange interaction between manganese ions of the type $J(R) \propto R^{-6.8}$ (Fig. 2). It appears from the available data that this radial dependence is rather universal for all II–VI wide gap semimagnetic semiconductors. A comparison is also made with other semimagnetic semiconductors and the physical exchange mechanism is discussed.

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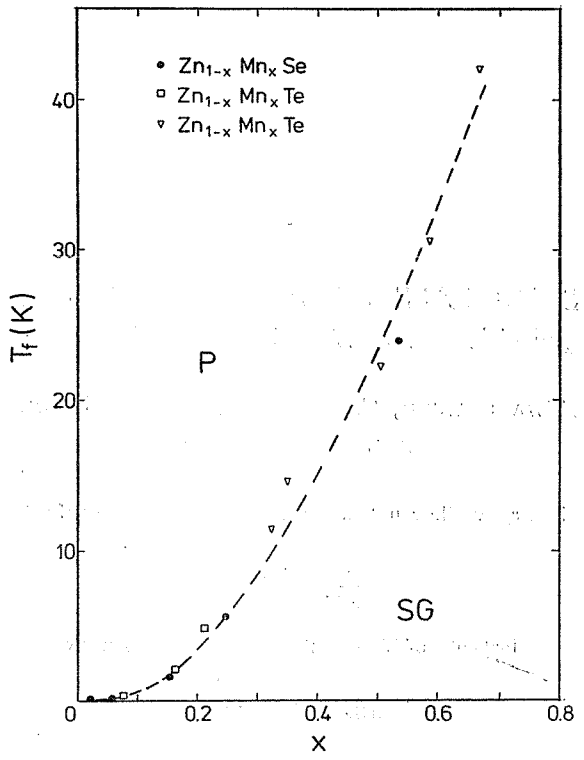

Fig. 1. Phase diagram for ZnMnSe (●) and ZnMnTe (□ — our data, ▽ — [1]). The dashed line is a guide to the eye only

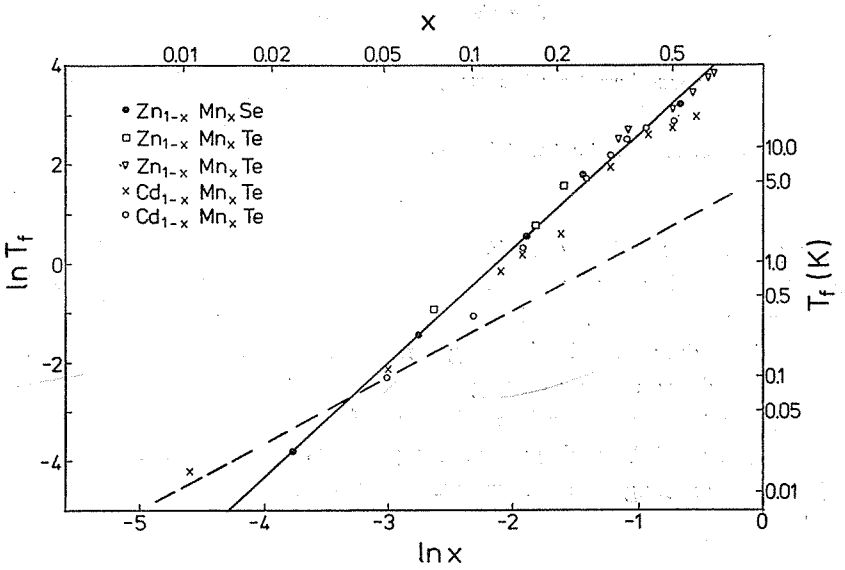

Fig. 2. Logarithm of the freezing temperature T_f as a function of log x for ZnMnSe (●), ZnMnTe (□ — our data, ▽ — [1]), CdMnTe (× — [2]) and CdMnSe (○ — [3]). The straight, solid line fitting the ZnMnSe and the ZnMnTe data has a slope equal to 2.26 yielding $J \propto R^{-6.8}$. The dashed line indicates $J \propto R^{-4.0}$

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Symko, D. J. Zheng, S. Os
R. Triboulet, J. L. Tholen
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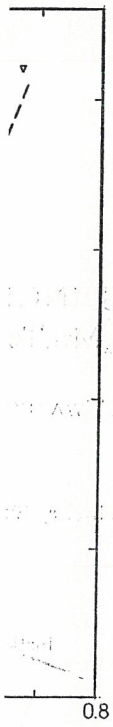
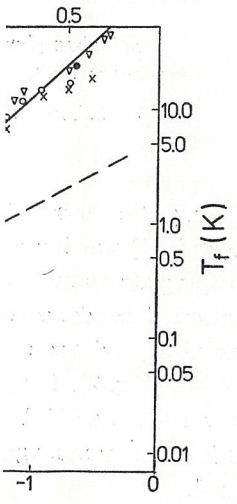


— [1]). The dashed line is a guide



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