relatively independent of pressure, and hence of ϵ_j, the spin quantum number S in eq. (3) is assumed constant. Furthermore, since $|S| = 0$ at $T \geqslant T_c$, it follows that for any temperature $T \geqslant T_c$

$$\frac{\Delta\theta}{\theta_o} = -P_1^{-1}P - \frac{1}{2}P_2^{-2}P^2 \tag{6}$$

where $\Delta\theta = (\theta - \theta_o)$ and θ_o is the value of θ at $P = 0$. If the influence of thermal expansion is neglected, the parameters are $P_1^{-1} \equiv \sum_j A_j$ and $P_2^{-2} = \sum_j \lambda_j^2 A_j^2$, which contain $\lambda_j \equiv \gamma_{uv}^j/\beta_{uv}^j$, $A_j \equiv \sum_i \beta_{uv}^j K_{ji}$, $B_j \equiv \sum_i \beta_{uv}^j K_{ji} \sum_k \alpha_k c_{ki}$. The remarkable susceptibility above T_c in Fe_2P indicates that

$$\theta = T_c\,(1 + a + p^{-1}P + \cdots) \quad \text{or} \quad \Delta\theta \approx (1 + a)\,\Delta T_c + T_c p^{-1}P \tag{7}$$

So long as $\lambda_j^2 \Delta\theta/\theta_o \ll 1$ remains valid, substitution of eq. (7) into eq. (6) gives

$$P = -Q_1 \Delta T_c - Q_1^2 Q_2\,(\Delta T_c)^2 \tag{8}$$

where $Q_1 \equiv (1 + a)\,[(\theta_o/P_1) + (T_c/p)]^{-1}$ and $Q_2 \equiv (\theta_o/2P_2^2)\,[(\theta_o/P_1) + (T_c/p)]^{-1}$. Comparison of eq. (8) with eqs. (1) and (2) shows that eq. (4) has the correct form and that $Q_1Q_2 \sim 3 \times 10^{-3}\,[K]^{-1} \sim \theta_o^{-1}$. Therefore $(P_1/P_2) \sim 1$, or $\lambda_j \sim 1$. If all the constants but θ_o and T_c in Q_1Q_2 are the same for Fe_2P and $Fe_2P_{0.9}As_{0.1}$, the ratio of the respective θ_o are $252 \times 1.7/710 \times 1.2 \approx 1/2$. The measured Curie temperatures at 1 atm are $T_c = 221K$ and $341K$, respectively, which demonstrates the essential self-consistency of the analysis. In fact, the small discrepancy can be qualitatively accounted for by the observation that the pressure sensitivity of T_c, and hence p, is larger in Fe_2P.

REFERENCES

1. J. B. Goodenough, Progress in Solid State Chemistry, Vol. 5, H. Reiss, ed. (Pergamon Press, 1972) Chap. IV; Proceedings of the Winter School in Solid State Chemistry, C. N. R. Rao, ed. (Plenum Press, New York) in press.
2. A. Catalano, R. J. Arnott, and A. Wold, J. Solid State Chem. (in press).
3. A. Roger, Thesis, Univ. of Paris, Orsay (1970).
4. N. Menyuk, J. A. Kafalas, K. Dwight, and J. B. Goodenough, Phys. Rev. 177, 942 (1969).
5. F. K. Lotgering, Proc. Int. Conf. Magnetism, Nottingham 1964, (Inst. Phys. and Phys. Soc., London) p. 533.
6. J. B. Goodenough, J. Solid State Chem. 3, 26 (1971) and its references.
7. Unlike $CoS_{2-x}Se_x$, crystal-field effects influence the magnetic interactions in Fe_2P and may introduce some antiferromagnetic near-neighbor interactions.