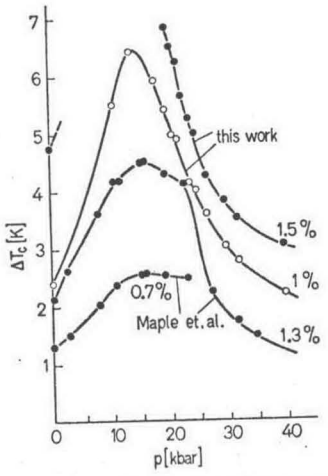

Fig. 5. Depression of the superconducting transition temperature in LaCe alloys under pressure. Numbers denote cerium concentrations. Samples with 1 and 1.5% Ce (this work) were fcc, those of Maple *et al.*[7] "as cast"

remarkable agreement with the theoretical value of 6.05 K, obtained from the formula of Müller-Hartmann and Zittartz[4]

$$\Delta T_{c\max} = -\frac{c}{8 k_B N(0)}$$

with $N(0)=2.4\ \mathrm{eV}^{-1}$ [8]. Also the dependence on concentration c is qualitatively obeyed. We wish to mention here that the results of Fig. 1 and 4, according to which $T_k=4$ K and $T_{c0}=7.7$ K at 14 kbar, i.e. $\vartheta\simeq 0.5$ for maximum pair breaking are inconsistent with the theoretical predictions of $\vartheta\simeq 2$ (Zuckermann[3]) and $\vartheta\simeq 12$ (Müller-Hartmann and Zittartz[4]). It must be recalled, however, that the theoretical results hold for very low concentrations only, whereas at 14 kbar the concentration of 1% Ce is close to the critical concentration at which the order parameter vanishes. Here it is noteworthy that, according to a theory of Coqblin and Schrieffer[12], Ce alloys cannot be described exactly by the Hamiltonian $H=JS\cdot\sigma$ because of the strong spin-orbit interaction of the 4 f state. Taking this into account, but using the Born approximation only, they obtain for the decrease of T_c nearly the same result as Eq. (3).

12 Coqblin, B., Schrieffer, J. R.: Phys. Rev. 185, 847 (1969).

To our knowledge the influence of resonance scattering on T_c has not been calculated with this Coqblin-Schrieffer Hamiltonian.

In conclusion, both the maximum in the depression of T_c and the results on the Kondo anomaly under pressure can be reasonably well correlated within existing theories, whereas no details, either experimental or theoretical, are known on the magnetic-nonmagnetic transition of the cerium ion in lanthanum lattices. While the results on the slopes of the R versus ln T curves may not fully permit an unambigous decision between both ways of interpretation, there is strong evidence from the continuous increase of the resistance in the pressure regime above 14 kbar that the maximum in pair breaking does not characterize the magnetic transition.

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