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Hall Effect at High Pressure in (SnxEu1-X)1.2Mo6S8

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almost to zero (similar to Fig 2 in ref 2). 15% Gd correspond to a very high concentration of magnetic ions per atoms where superconductivity still can exist, namely 5%. For $La_{1-x}Er_xOs_2$ we found superconductivity up to x=.40 corresponding to 13% – very close to $ErRh_4B_4$ (11%) or $Gd_{1.2}Mo_6S_8$ (8%). We will show results for χ_{ac},χ_{dc}, field and zero field cooling effects as well as the time dependence of the TRM. We use the superconductivity of the host to probe the internal fields of the spinglass. Field cooling in small external fields suppresses the superconductivity.

1) W. Schrittenlacher et al. Sol.State Comm.16,923(75)
2) D. Davidov et al. J.Phys. F7, L47(77)

GJ 7 Small Angle Neutron Scattering from $(Ce_{0.82}Tb_{0.18})Ru_2$, J.A. FERNANDEZ-BACA and J.W. LYNN, Dept. of Physics, U. of Maryland,* College Park, MD 20742 and National Bureau of Standards, Washington, D.C. 20234 —We have carried out small angle neutron scattering measurements on the pseudo-binary superconductor $(Ce_{0.82}Tb_{0.18})Ru_2$ in order to study the spatial and temperature dependence of the magnetic correlations in this system. The measurements were performed for momentum transfer ($|\vec{K}|$) values between 0.04 and 0.15 $Å^{-1}$. The data were found to be well represented by an Ornstein-Zernike correlation function, with a correlation range which smoothly increased from $\xi \approx 8$ Å at T=5K and to ξ=16 Å at T=1.17K, with no sign of saturation. This behavior is similar to that found in the $(Ce_{.73}Ho_{.27})Ru_2$ system[1] over the same temperature interval, but disagrees with the temperature dependence reported[2] for $(Ce_{.8}Tb_{.2})Ru_2$.

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[1]J.W. Lynn, D.E. Moncton, L. Passell, and W. Thomlinson, Phys. Rev. B21, 70 (1980).
[2]S. Roth, K. Ibel, and W. Just, J. Appl. Cryst. 7, 230 (1974).

GJ 8 Evidence of Magnetic Ordering Above T_{c_2} in $ErRh_4B_4$.* G. CORT, R. D. TAYLOR and J. O. WILLIS, Los Alamos Scientific Laboratory.** We report the results of a study using the Mössbauer Effect (ME) as a hyperfine field microprobe in the re-entrant superconductor $ErRh_4B_4$. The temperature dependence of the magnitude of the ^{57}Fe hyperfine field (at Rh sites) was determined for a sample lightly doped with ^{57}Co. At all temperatures the ME spectrum is comprised chiefly of a quadrupole doublet. Well below the re-entrant temperature T_{c_2} ($\sim$ 0.9 K) a portion of the probe sites exhibits a saturation hyperfine field $\sim$ 0.5 T reflecting the ferromagnetic order of the host. The collapse of this hyperfine field is not complete until the temperature reaches $\sim$ 1.1 K. Thus superconductivity and spontaneous magnetic order are found to coexist over a limited temperature range near T_{c_2}, in qualitative agreement with the neutron scattering results of Moncton et al.[1]

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[1]Moncton, D. E., D. B. McWhan, P. H. Schmidt, G. Shirane, and W. Thomlinson, AIP Conf. Proc. 24, 391 (1979).

GJ 9 Long Range Oscillatory Magnetic State in the Re-entrant Superconductor $HoMo_6S_8$, J.W. LYNN, Dept. of Physics, U. of Maryland*, College Park, Md. 20742 (USA) J. JOFFRIN & R. PYNN, Institut Laue Langevin, BP 156, Grenoble, Cedex (France)--High resolution small-angle neutron scattering experiments have been carried out on $HoMo_6S_8$ to investigate the magnetic behavior in the vicinity of the reentrant superconducting transition ($T_{cooling}^{Reentry}$=0.61K). With decreasing temperature a single magnetic Bragg peak develops below T_M=0.75K at a wavevector Q_c=0.30 $Å^{-1}$, demonstrating that a transversely polarized oscillatory magnetic structure has formed with a characteristic wavelength λ=200 Å. With further decrease of temperature additional scattering develops at smaller wavevectors, and the Bragg peak intensity decreases, as the transition to the ferromagnetic state proceeds and superconductivity is destroyed. The spectrum of scattering below 0.71K has no peak in the range $0.002<Q<0.063$ $Å^{-1}$. On warming from low temperatures no peak is found at finite Q at any temperature. However, near the reentrant superconducting transition ($T_{warming}^{Reentry}$=0.67K) there is an enhancement of the scattered intensity for $Q \sim 0.025$ $Å^{-1}$.

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GJ 10 Depression of Superconductivity in Solid Solutions of $Lu_2Fe_3Si_5$ with $RE_2Fe_3Si_5$ (RE = Sc, Y, Dy, Ho, Er, Tm),* H. F. BRAUN and C. U. SEGRE, Univ. of Calif., San Diego--Pseudoternary solid solutions $(Lu_{1-x}RE_x)_2Fe_3Si_5$ between the superconductor $Lu_2Fe_3Si_5$ (T_c = 6 K) and compounds $RE_2Fe_3Si_5$ that are superconducting (RE = Sc, Y) or exhibit antiferromagnetic ordering (RE = Dy-Tm) have been studied by means of ac susceptibility measurements. The critical temperature of the Lu compound decreases upon substitution. The initial rates of depression are 1.07 and 0.6 K/at.% for Sc and Y and between 0.8 and 0.06 K/at.% for Dy-Tm and depend primarily on the radius difference between the Lu ion and the substituent rather than on the magnetic character of the latter. The possibility of coexistence of superconductivity and antiferromagnetic order in $(Lu_{1-x}Er_x)_2Fe_3Si_5$ is discussed.

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GJ 11 Pressure Dependence of Superconductivity in Rare Earth Iron Silicides,* C. U. SEGRE and H. F. BRAUN, Univ. of Calif., San Diego--The effect of hydrostatic pressure up to 24 kbar on the superconducting transitions of $RE_2Fe_3Si_5$ (RE = Sc, Y, Lu) has been measured. $Sc_2Fe_3Si_5$ (T_c = 4.3 K) and $Lu_2Fe_3Si_5$ (T_c = 6.0 K) exhibit a depression of T_c with increasing pressure. The approximate slope is -0.120 K/kbar for $Sc_2Fe_3Si_5$ and -0.088 K/kbar for $Lu_2Fe_3Si_5$. $Y_2Fe_3Si_5$ (T_c = 2.3 K) however, shows a dramatic increase of T_c with pressure, with an initial slope of +0.662 K/kbar. T_c attains a maximum of 4.9 K at 18 kbar and decreases to 4.6 K at 21 kbar. The implication of these pressure effects on the role of Fe in superconductivity is discussed.

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GJ 12 Hall Effect at High Pressure in $(Sn_xEu_{1-x})_{1.2}Mo_6S_8$. P. D. HAMBOURGER, Cleveland State U., C. Y. HUANG,* Los Alamos Scientific Lab, and H. L. LUO,† UCSD.--The Hall coefficient and resistivity of $Sn_{0.12}Eu_{1.08}Mo_6S_8$ have been measured over the range $1.5<T<300$ K under hydrostatic pressure up to 7 kbar. Superconductivity is induced by the application of relatively low pressures, with $T_c \sim 5$ K at 7 kbar. Data at all pressures suggest thermally-activated (rather than metallic) conduction at $T>T_c$. Carrier concentration at T=12 K (estimated from 1-band approximation) increases with pressure from $\sim 4 \times 10^{18}$ cm^{-3} at 1 bar to $\sim 1 \times 10^{20}$ cm^{-3} at 7 kbar. Measurements on samples with other Eu concentrations will be presented, and the data will be discussed in terms of models of band structure and superconductivity in this compound.

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