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Magnetic and Transport Properties of Amorphous GdGe Alloys near the Metal-Insulator Transition NAREG SINENIAN, KEVIN MCCARTHY, J.J. CHERRY, LI ZENG, ERIK HELGREN, FRANCES HELLMAN, Dept. of Physics, UCSD, D. J. SMITH, RAFIQ ISLAM, Arizona State University — The temperature and field dependence of magnetization and conductivity of amorphous Ge doped with the rare earth Gd (a-Gd_xGe_{1-x}) has been measured for a range of x near the metal-insulator transition $0.08 < x < 0.25$). As in previous work on $a-$Gd-Si, high field magnetization and low field susceptibility per Gd atom in the paramagnetic state above the spin glass freezing temperature are significantly suppressed below that of non-interacting Gd, indicative of strong antiferromagnetic interactions. However, *unlike* $a-$Gd-Si, the low field susceptibility does not fit a Curie-Weiss law, instead showing $1/T^{\alpha}$ dependence. As in $a-$Gd-Si, Gd causes localization of charge carriers below a characteristic temperature T*, which is also an onset of significant negative magnetoresistance MR. Both T* and the magnitude of MR are however significantly less in $a-$Gd-Ge than in comparable $a-$Gd-Si alloys. It is suggested that the large effects of matrix (Ge vs Si) are due to differences in dielectric constant and bandgap, which cause changes in screening, thereby altering the effect of the magnetic moments of Gd on both localization of carriers and on the indirect mediated Gd-Gd exchange interactions. We thank the NSF for support.

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