Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Magnetic ordering and valence instability in Kondo system $CeMn_{2-x}Cu_xSi_2$ GAN LIANG, SHELLEY KEITH, JESSE VERNON, Sam Houston State University, F. YEN, University of Houston — The transition from a 3d-antiferromagnetically ordered mixed valence system to a Kondo lattice system has been studied for the $CeMn_{2-x}Cu_xSi_2(0 \leq x \leq 1)$ series. The Ce L_3-edge x-ray absorption result shows that the series evolves from a Ce mixed valence system at $x = 0$ to a nearly trivalent system at $x = 2$. The resistivity results show that in the low Ce valence region (x greater than 1.0), the system exhibits a crystalline-field modified Kondo lattice behavior. In the high valence region, however, the system displays a behavior of the prototype mixed valence compound $CePd_3$. Magnetization (M) data were taken in both zero-field-cooled (ZFC) and field cooled (FC) processes. It is found that for $0 \leq x < 0.4$, Neel temperature decreases rapidly with the increase of the Cu concentration x. In the range of x from $0.4 \leq$ x < 0.8, ferromagnetic phase is observed below 150 K, and both the ordering temperature T_c and Qurie-Weiss temperature θ decrease with the increase of x. For $x \geq 0.8$, the M (T) curves are reversible and display paramagnetic behavior. Thus, the system is non-magnetic as it approaches heavy-fermion compound $CeCu_2Si_2$. Finally, a magnetic phase diagram is proposed for this compound series.

Gan Liang
Sam Houston State University

Date submitted: 30 Nov 2005 Electronic form version 1.4