Abstract Submitted
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Crystal structure and ferromagnetic phase transitions in $CeCu_{1-x}Ge_{1+x}$ ($0.0 \leqq x \leqq 0.3$)[1] W.H. LEE, S.Y. SHIH, H.H. SUNG, K.J. SYU, S.C. CHEN, National Chung Cheng University, W.H. LEE TEAM — As revealed in the powder x-ray diffraction and crystallographic data, the single phase sample in the series $CeCu_{1-x}Ge_{1+x}$ ($0.0 \leqq x \leqq 0.3$) crystallizes in the AlB_2-type structure with space group P6/mmm. The maximum ferromagnetic transition temperature T_c in $CeCu_{1-x}Ge_{1+x}$, as determined from the electrical- resistivity and magnetic susceptibility measurements, is 10.6 K for the compound $CeCu_{0.8}Ge_{1.2}$. The magnetic susceptibility for each sample in $CeCu_{1-x}Ge_{1+x}$ ($0.0 \leqq x \leqq 0.3$) follows Curie's behavior between 100 and 300 K with an effective moment 2.6 ± 0.1 μ_B/Ce atom, a value close to that of Ce^{3+}. However, the observed saturation magnetic moment values ($0.96 \sim 1.15$ μ_B) at low temperatures for all these compounds are well less than the theoretically expected value 2.14 μ_B for the free Ce^{3+} ion tangling the entire six-fold J = 5/2 multiplet. Subtracting the estimated phonon contribution from LaCuGe, the entropy associated with the magnetic structure of CeCuGe is found to meet the theoretical value of Rln2, which would be expected for a doublet ground state of Ce^{3+} ion in the compound CeCuGe. The reduced saturation moment in $CeCu_{1-x}Ge_{1+x}$ is reasonably ascribed to partial lifting of the 4f-electron level degeneracy.

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