SUBSTITUTION STUDY ON THE COHERENT KONDO STATE IN $CeCu_5In$

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9.7 cm

The compound $CeCu_5In$ crystallises in an ordered orthorhombic structure of its own type, which is closely related to that of $CeCu_6$. The magnetic, electrical transport and specific heat properties of this ternary phase indicate the formation at low temperatures of a coherent Kondo state without long-range magnetic order down to 1.7 K. Upon substitution of In or Ni for Cu the crystal structure type does not change. However, in $CeCu_{5-x}In_{1+x}$ alloys two crystallographic sites have mixed Cu/In occupation, whereas in $CeCu_{5-x}Ni_xIn$ alloys probably all the transition metal sites are occupied by a statistical mixture Cu/Ni. These structural features have an enormous effect on the physical behaviour in the two systems. While the coherent Kondo state is destroyed immediately upon even very small Cu→In exchange, it survives the Cu→Ni substitution up to the Ni-atom concentration x = 0.4. Interestingly, all the alloys studied remain paramagnetic down to the lowest temperatures and exhibit a pronounced Kondo effect in the whole temperature range. The results obtained here for $CeCu_{5-x}In_{1+x}$ and $CeCu_{5-x}Ni_xIn$ will be compared to those found previously for magnetically diluted alloys $Ce_{1-x}La_xCu_5In$ as well as for substitutional alloys $CeCu_5In_{1-x}Ga_x$ and $CeCu_5In_{1-x}Al_x$.

13.4 cm

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