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Disorder and quantum size effects on Kondo interactions and magnetic correlation in $CePt_2$ Y.Y. CHEN, T.K. LEE, Institute of Physics, Academia Sinica, Taipei, Taiwan, J.M. LAWRENCE, Department of Physics and Astronomy, University of California, Irvine, California , C.H. BOOTH, Chemical Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, California —
Measurements of specific heat C(T) and magnetic susceptibility χ(T) on a series of $CePt_2$ nanoparticles with size d= 3.1, 22 and 26 nm are compared to those of bulk $CePt_2$ to determine the size effects on Kondo interactions and magnetic correlation therein. Kondo interactions (T_K=5.6 K) and an antiferromagnetic correlation (T_N=1.6 K) coexist in $CePt_2$ with ∼60% and ∼40% of Ce magnetic ions involved in respectively. While the antiferromagnetism is diminished by size reduction, Kondo behaviour predominates, with a sommerfield constant γ increasing from 460 mJ/f.u. K^2 for the bulk to 3000 mJ/f.u. K^2 for 3.1 nm. Meanwhile, a decrease of Kondo temperature T_K from 5.6 to 0.42 K is observed with the size reduction. The consequences were explained by structural disorders, however for d $<$ 10 nm electronic quantum size effect play a more significant role.

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