

Itinerant iron magnetism and high spin polarization in filled skutterudites

Compounds with the filled skutterudite structure are currently under intensive investigation due to their wide spectrum of ground state properties. Here, we report a combined theoretical and experimental study of the electronic and magnetic properties of the compound family AFe_4Sb_{12} ($A=Na,K,Ca,Ba,Yb$) by means of band structure calculations and measurements of point-contact Andreev reflections, optical spectra and thermodynamic properties. Whereas the compounds with $A=Na,K$ order ferromagnetically with a high transport spin polarisation $P_t \sim 67\%$, the magnetic order for $A=Ca,Ba,Yb$ is suppressed by strong spin fluctuations. The latter compounds show a metamagnetic transition in high magnetic fields as suggested by fixed spin moment calculations. The Yb compound, formerly considered as a heavy fermion system, is proven to be in a stable divalent state by band structure calculation and optical and thermodynamic data.