

Magnetic phases in pseudoternary system $\text{UCo}_{1-x}\text{Ru}_x\text{Al}$

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UCoAl and URuAl , which crystallize in the hexagonal ZrNiAl -type structure, remain paramagnetic at least down to 30 mK. At He temperatures, UCoAl shows a metamagnetic transition at a magnetic field of ≈ 0.6 T applied along the c -axis [1]. Despite the paramagnetism of parent compounds a huge dome of stable ferromagnetism exists over a wide concentration range of pseudoternary $\text{UCo}_{1-x}\text{Ru}_x\text{Al}$ compounds [2]. For $x \geq 0.4$, there seems to exist two ferromagnetic phases depending on temperature [2]. We have grown three single crystals of the representative composition $x = 0.56, 0.70$ and 0.78 , respectively, and investigated the character and temperature range of stability of the two ferromagnetic phases by measuring magnetization, electrical resistivity, heat capacity, thermal expansion and thermal transport properties. A scenario will be discussed considering different coherence of the two magnetically ordered phases.

References:

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- [2] A.V. Andreev, Philosophical Magazine B, 75, 827 (1997)