

**MAGNETIC AND TRANSPORT PROPERTIES OF
Cu-FLUX-GROWN UCu₂Si₂**

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In the literature a serious controversy exists as to the magnetic properties of the silicide UCu₂Si₂, crystallizing in the tetragonal ThCr₂Si₂ type crystal structure. Various authors reported either ferro- or antiferro-ferro transitions at temperatures below about 100 K. To solve this problem we have grown single crystals of UCu₂Si₂ from Cu flux and performed a detailed study carrying out measurements of ac and dc susceptibility, electrical resistivity, magnetoresistivity and thermoelectric power. UCu₂Si₂ orders presumably antiferromagnetically with $T_N = 106$ K, i.e. about 2-3 K above the ferromagnetic transition at $T_c = 103$ K, as demonstrated by the temperature variation of the ac-susceptibility. In contrast to previous single-crystalline report on UCu₂Si₂, no sign of the transition into antiferromagnetic behaviour has been observed below 50 K. The magnetic properties are highly anisotropic, with an easy axis [001], as one can expect from the crystal structure. The saturation moment has been determined at 4.2 K is $1.55 \mu_B$. The electrical resistivity in the ferromagnetic region may be described assuming an energy gap Δ in the spin wave energy spectrum. In the paramagnetic region, where the effective moments are about $3.0 \mu_B$, the electrical resistivity is determined by an interplay of Kondo scattering and crystal field effects. The magnetoresistivity below T_C for both tetragonal axes is negative, as one expects for a ferromagnet. The thermopower is negative at low temperatures and positive at higher temperatures.

9.7 cm

13.4 cm

Subject category :

4. Rare Earths and Actinides, Alloys and Compounds

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