Thermoelectric power of Ce_2RhSi_3

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9.7 cm

Ce_2RhSi_3 crystallizes with a hexagonal structure of the AlB_2 type. The compound was found to order antiferromagnetically at $T_N = 4.5\ K$ with the magnetic moments confined to the hexagonal basal plane. The metamagnetic-like transition occurs in the field $6\ T$. In the paramagnetic region the magnetic susceptibility follows a Curie-Weiss law with the effective magnetic moments close to the free Ce^{3+} ion value and the paramagnetic Curie temperature being strongly negative. Above T_N the electrical resistivity and magnetoresistivity variations show behaviour characterictic of single ion Kondo systems. We present here for the first time the results of thermoelectric power measurements performed down to $2\ K$ in magnetic fields up to $13\ T$ on the oriented single-crystals of Ce_2RhSi_3. The Seebeck coefficient measured with the temperature gradient set along two main crystallographic directions exhibits distinct anisotropy. The values of the thermopower are rather small (of about several $\mu V/K$ at room temperature). The overall temperature behaviour of the Seebeck coefficient down to $50\ K$ can be properly described in the framework of the two band approach that originates from the Hirst model. Then, with decreasing temperature the thermoelectric power changes sign, shows a negative minimum and start to increase giving maximum near T_N, which is depressed upon applying external magnetic field along a-axis (easy magnetic direction). On the contrary, magnetic field applied along c-axis (hard magnetic direction) does not effect the overall shape of the thermoelectric power curves.

13.4 cm

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