Magnetic field effect on resistive transition of thallium based superconductors

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9.7 cm

The resistive transition from a normal to the superconducting state of high temperature superconductors is almost always significantly broadened as compared to the low temperature superconductors. Especially the width of the resistive transition increases when the applied magnetic field or the large flowing current is present. The thallium based superconductors are characterized by the widening of the resistive transition below the critical temperature when the applied magnetic field is switch on.

The field-broadened resistive transition may be described by the following equation: $\Delta T = CH^m + \Delta T_0$, where the width of the resistive transition was usually defined by the formula: $\Delta T = T_{90\%} - T_{10\%}$ [1] The value of m should be 2/3, but it was found to depend on some properties of a superconductor. ΔT_0 is the width of the resistive transition at zero applied magnetic field and the coefficient C depends on the critical current at zero magnetic field and on the critical temperature.

In this paper we study the magnetic field dependence of the onset transition temperatures, the critical temperatures and the zero resistive critical temperatures of the selected thallium based superconductors.

[1] W.M. Woch, R. Zalecki, A. Kołodziejczyk, O. Heiml and G. Gritzner, *Physica C* **434** (2006) 17.

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