



PERMANENT REFERENCE

CONSTRUCTION OF RESISTIVITY PROBE, AND RESISTANCE MEASUREMENTS ON $YBa_2Cu_3O_7$ SUPERCONDUCTORS.

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Abstract

Although superconductivity was discovered long before, so far discovered superconductors are superconducting far below room temperature. Scientists worldwide are in search for room temperature superconductors which would bring a revolution in technology.

This project focuses on the construction of a Resistivity Probe which would measure the resistance of high temperature superconductors; by which the transition temperature of the respective superconductor is obtainable.

The construction is to achieve and control sample temperatures around 77K and above by immersion of the probe into liquid nitrogen. In this probe the heat flow from surrounding to the sample is minimized, and the sample is loosely thermally connected to liquid nitrogen reservoir. The temperature of the sample is controlled by electrical heating.

Temperature control of the experimental region was checked and has been revealed that the vacuum system, the electrical heating and the thermometry of the Resistivity Probe function perfectly well. Further, resistance measurements on two $\text{Y-Ba}_2\text{Cu}_3\text{O}_7$ superconductors were carried out and their superconducting transition temperatures were found to be $T_c=89.8\text{ K}$ and $T_c=88.0\text{ K}$.

The accuracy of the results can be increased if measuring instruments of better resolution are used.

Contents

	Page
Abstract	01
Chapter 1 : Introduction	02
Chapter 2 : Physical properties of superconductors. ..	06
2.1. Zero electrical resistance.	06
2.2. Meissner effect.	07
2.3. Combined effect of temperature and magnetic field.	07
2.4. Magnetic behavior of a superconductor.	08
2.5. Thermal properties of a superconductor.	10
Chapter 3 : Construction of Resistivity Probe.	11
3.1. Sample and Thermometer Holder.	11
3.2. Experimental Chamber.	12
3.2.1. Sample Holder Supporting Tube.	14
3.2.2. Experimental Chamber Wall.	14
3.2.3. Chamber Holder.	14
3.2.4. Shielding copper sheet cover.	15
3.2.5. Heater.	15
3.3. External control to the experimental-chamber.	16
3.3.1. Outer Stainless Steel Tube.	16
3.3.2. Connections to the rotary pump.	16
3.3.3. Electrical wiring.	17
3.3.4. Top Coupling with pins.	18
3.4. Estimations for some experimental parameters.	20
3.4.1. Degree of thermal isolation of Sample Holder.	20
3.4.2. Temperature control of the sample.	21
3.4.3. Heat leak from surrounding room temperature to experimental chamber.	22

Chapter 4 : Experimental techniques and presentation of results. ...	24
4.1. Experimental techniques.	24
4.1.1. Thermometry.	24
4.1.2. Sample mounting.	24
4.1.3. Soft soldering.	26
4.1.4. Electrical circuit of the experiment.	26
4.2. Procedure of experiment and presentation of results.	28
4.2.1. Experiment with empty chamber.	28
4.2.1.1. Procedure of experiment.	28
4.2.1.2. Presentation of results.	28
4.2.2. Resistance measurements on YBCO sample	31
4.2.2.1. Procedure of experiment.	31
4.2.2.2. Presentation of results.	31
4.3. Summary	39
 Chapter 5 : Discussion	 40
 Reference	 43

Appendix A: Calibration Chart of resistant thermometer.

Appendix B: Diagrams of vacuum tight Couplings.

Appendix C: Limit of resolution.

Appendix D: Data of resistance measurements on YBCO.