

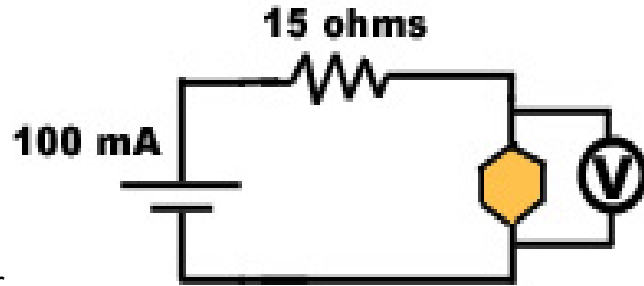
High-Temperature Superconductivity

Name: _____ Sec./Group _____ Date: _____

Experiment 1: BSCCO Resistance

Equipment:

1. Constant-current power supply
2. 15-ohm resistor
3. Superconductor sample
4. High-precision digital DC voltmeter
5. Portable DC voltmeter (for thermocouple)



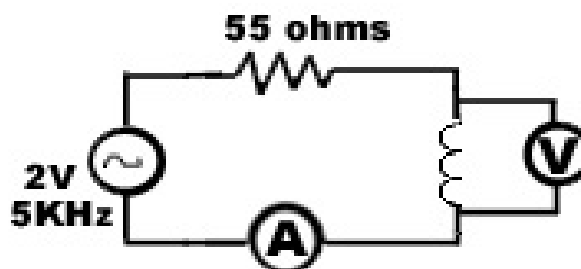
thermocouple (mV)	temp (K)	voltage drop (V)	calculated resistance (mΩ)
0	293		
6.4	77		
6.3	80		
6.2	82		
6.1	85		
6	87		
5.9	90		
5.8	93		
5.7	95.5		
5.6	98		
5.5	100.5		
5.4	103		
5.3	106		
5.2	109		

thermocouple (mV)	temp (K)	voltage drop (V)	calculated resistance (mΩ)
5.1	112		
5	114		
4.9	117		
4.8	120		

Experiment 2: YBCO Susceptibility

Equipment:

1. AC power supply
2. 55-ohm resistor
3. Inductor with YBCO core
4. Oscilloscope (reads rms voltage)
5. Portable AC ammeter (reads rms current)
6. Portable DC voltmeter (for thermocouple)



thermocouple (mV)	temp (K)	rms voltage (V)	rms current (mA)	resistance (Ω)	inductance (mH)	susceptibility (no units)
0	293			40		0 (approx.)
6.4	77			5.01		
6.3	80			5.11		
6.2	82			7.26		
6.1	85			7.7		
6	87			8.1		
5.9	90			8.9		
5.8	93			9.5		
5.7	95.5			10.1		
5.6	98			10.9		
5.5	100.5			11.6		

thermocouple (mV)	temp (K)	rms voltage (V)	rms current (mA)	resistance (Ω)	inductance (mH)	susceptibility (no units)
5.4	103			12.4		
5.3	106			13.2		
5.2	109			13.9		
5.1	112			14.6		
5	114			15.3		
4.9	117			16		
4.8	120			16.7		

Estimates of critical temperatures:

BSCCO: _____ °K +/- _____ °K

YBCO: _____ °K +/- _____ °K