

Resistivity by Four Probe method

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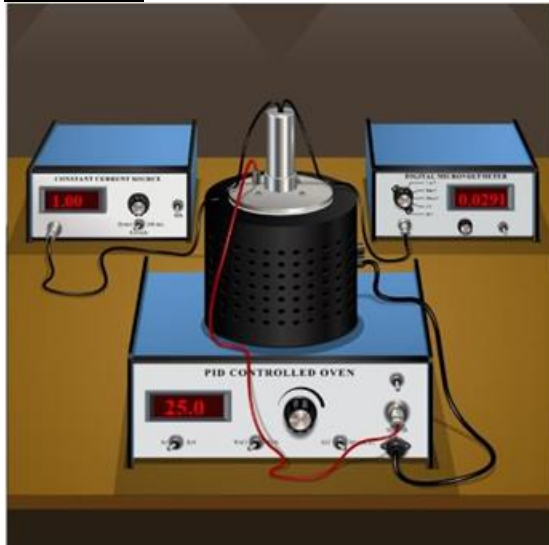
Aim:

To find the resistivity of a semiconductor by four probe method

Apparatus:

The experimental set up consists of probe arrangement, sample, oven 0-200°C, constant current generator, oven power supply and digital panel meter (measuring voltage and current). Four probe apparatus is one of the standard and most widely used apparatus for the measurement of resistivity of semiconductors.

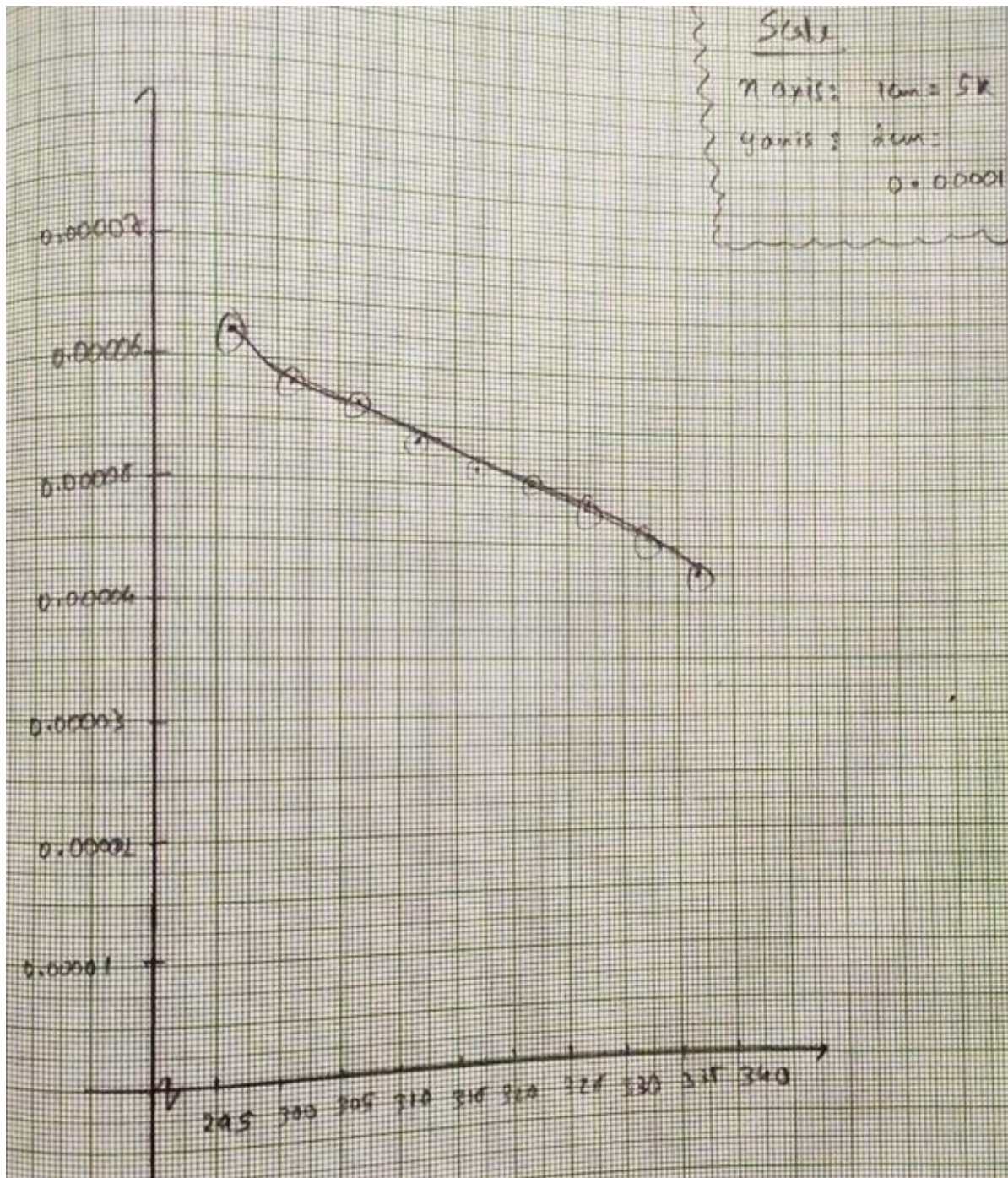
Diagram:



Observations Table:

Obs. No.	Temperature T (K)	Voltage V(V)	Current I (A)	Resistivity ρ (ohm m)
1	298	2.1810	75	0.0000620
2	303	2.1163	75	0.0000601
3	308	2.0555	75	0.0000584
4	313	1.9984	75	0.0000568
5	323	1.9445	75	0.0000553
6	328	1.8937	75	0.0000538
7	333	1.8458	75	0.0000524
8	338	1.8004	75	0.0000512
9	343	1.7574	75	0.0000499

Plot graph of Temperature (along x-axis) and resistivity (along y-axis)



Calculations:

Resistivity can be calculated by using the equation given below.

$$\rho = \frac{\rho_0}{f(w/s)} = \dots\dots\dots \text{ohm m}$$

$$\rho_0 = \frac{V}{I} 2\pi S = \dots\dots\dots \text{ohm m}$$

Given: 1. Distance between the probes (S) = 0.2cm

2. Thickness of the sample, (W) = 0.05cm

3. From standard table $f(w/S) = 5.89$

Result: The resistivity of the given semiconductor by four probe method= 0.0000620 Ohm m