

Lab Report

RESISTANCE CHANGE WITH LENGTH

Aim: The aim of this experiment is to determine if and how the length of a material affects its resistance.

Theory: According to ohm's law $R = V/I$,

R = Resistance

I = current

V = Voltage.

The electric resistance of a material is obstruction of the flow of electric current through the material. Every material has electric resistance and the reason why some objects are good conductors and others are not is in the varying electric resistance in different materials. Copper is a good conductor because its resistance is just 3 ohms, but wood is a bad conductor because its resistance is very high. Wood has a resistance of 10,000,000 ohms.

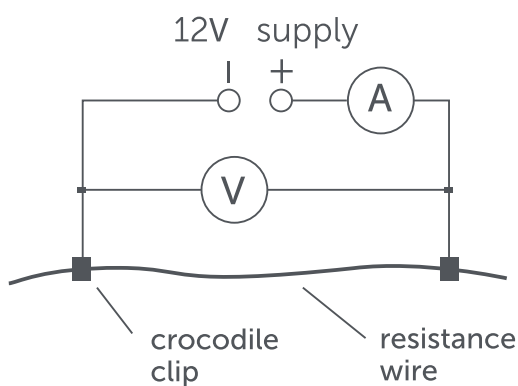
Apparatus:

- Power supply for the circuit

- 1 meter of wire
- Ammeter
- Voltmeter
- Meter rule
- 4 clips
- Leads to connect the circuit together.

Method:

- Connect 1m of wire onto the meter rule to give the piece of wire accurate measurements;
- Setup the circuit in such a way:



- Using the meter rule, set the wire length to 10cm and record the readings.
- Repeat the previous step for lengths 15cm, 20cm and 30cm.

Results:

Length = 10cm

Voltage	Current	Resistance
2.1	3.6	0.58
2.3	4	0.58
2.6	4.5	0.58
2.9	5	0.58
3.2	5.5	0.58
3.5	6	0.58

Length = 15cm

Voltage	Current	Resistance
3.3	3.6	0.93
3.7	4	0.93
4.2	4.5	0.93
4.6	5	0.93
5.2	5.5	0.93
5.6	6	0.93

Length = 20cm

Voltage	Current	Resistance
4.5	3.6	1.25
5	4	1.25
5.6	4.5	1.25
6.2	5	1.25
6.9	5.5	1.25
7.5	6	1.25

Length = 30cm

Voltage	Current	Resistance
6.4	3.5	1.8
8.1	4.5	1.8
9.1	5	1.8
10.1	5.5	1.8
11	6	1.8
11.9	6.5	1.8

CONCLUSION

The experiment has proven that length of a wire has an increasing effect on its resistance, this is because the longer the wire is, the larger the lattice structure which means more positive metal ions. This creates more collision between free electrons and metal ions, in its turn increasing resistance of the material.