Candidate 5 evidence

Characteristics of a thermistor

Aim: to ~~find~~ investigate how the resistance of a thermistor varies with temperature

Underlying physics:

A thermistor is an electrical resistor which it's resistance is reduced by heat. Resistance is the difficulty charges have in moving through a material. A thermistor uses sensors to help regulate heat. As well as regulating heat it can also be used to regulate voltage eg volume control. Thermistors can also be used in fire alarms. This works as when the heat from the fire increases it then activates the thermistor which activates the alarm. ~~There are two types of resisters~~

There are two types of ~~resi~~ thermistors. A PTC and an NTC. A PTC is a positive temperature coefficent. Which ~~as temperature rises~~ when it's temperature rises ~~so~~ the resistance also increases. Whereas in an NTC. which is a Negative temperature coefficent as the temp increases the resistance decreases.

The graph of a thermistor is similar to the graph of an LDR. This is because both have the same exact curves. The only difference is that an LDR varies with light levels and not resistance. In the graph of a resistor, the resistance remains constant throughout

and is a straight line.

A Thermistors are made from a mixture of metals and metal oxide materials. There are many advantages to a thermistor some ~~that~~ include the fact that due to their high sensitivity it means they work well over small temperature ranges. They are low costs, which means they are cheap to replace and they are small.

Method:

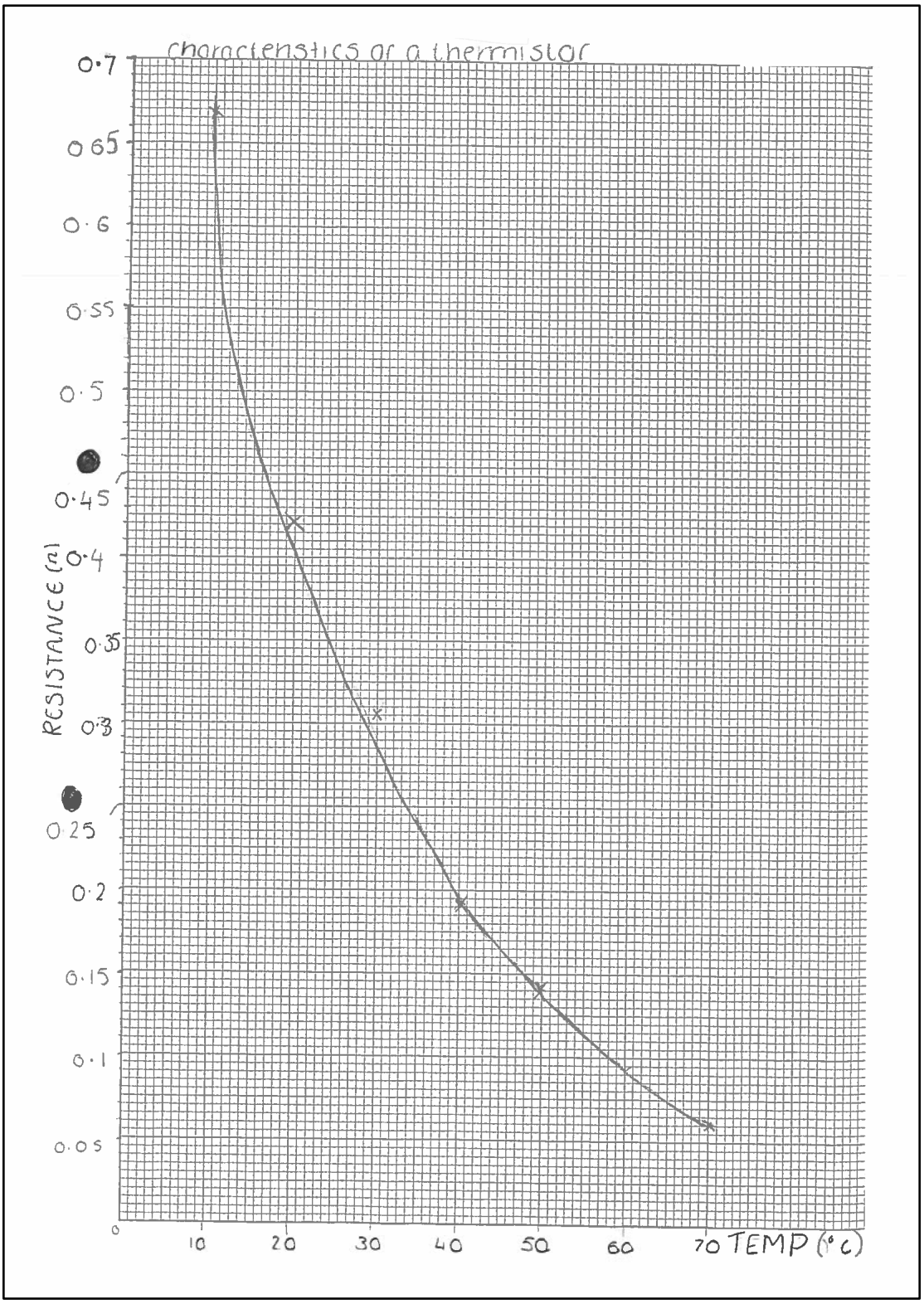
firstly I connected the thermistor to an ohm meter. Then I placed the thermistor into a beaker of boiling water. Each 10°C I recorded the resistance as it cooled. I then repeated this 2 more times.

	Resistance(Ω)			
temp(°C)	try 1	try 2	try 3	Averages(Ω)
70	0·065	0·052	0·050	0·056
60	0·075	0·113	0·070	0·086
50	0·180	0·140	0·111	0·144
40	0·136	0·205	0·226	0·189
30	0·200	0·350	0·376	0·309
20	0·309	0·435	0·519	0·421
10	0·665	0·629	0·676	0·656

Averages

: 0·065 + 0·052 + 0·050 = 0·167 ÷ 3

= 0·556 = ~~0·56~~ 0·056Ω


characteristics of a thermistor
RESISTANCE (Ω)
0·7
0·65
0·6
0·55
0·5
0·45
0·4
0·35
0·3
0·25
0·2
0·15
0·1
0·05
0
10
20
30
40
50
60
70
TEMP (°C)

Analysis:

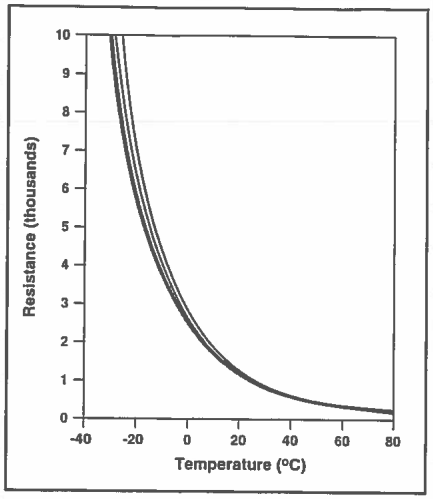


Figure 2. R-T slope changes for differing thermistor materials.

Websit for ~~sourg~~ source graph:

https://www.newport.com/medias/sys_master/images/h8c/hf3/8797049421854/AN02-selecting-and-using-Thermistors-for-Temperature-control.pdf

my graph shows that as temperature increas, the resistance decreases. ~~The~~ This is the same for my source graph As the temperature increases the resistance degreases. Both have the same exact curve, which decreases as temperature increases.

conclusion:

In my experiment I have found out ~~that~~ how the resistance of a thermistor vanes with heat. ~~This is that~~ Overall it has shown that if temperature increases the resistance of ~~a~~ the thermistor decreases.

~~Evaluation.~~

Evaluation:

Instead one way in which I would do my experiment differently would be to repeat the experiment more times which means I am would be able to take more averages which would make it more reliable as there is more. Another thing I could have done would be to have recorded the resistance over more temperatures. Both of these would make my experiment more reliable and make the graph more reliable.