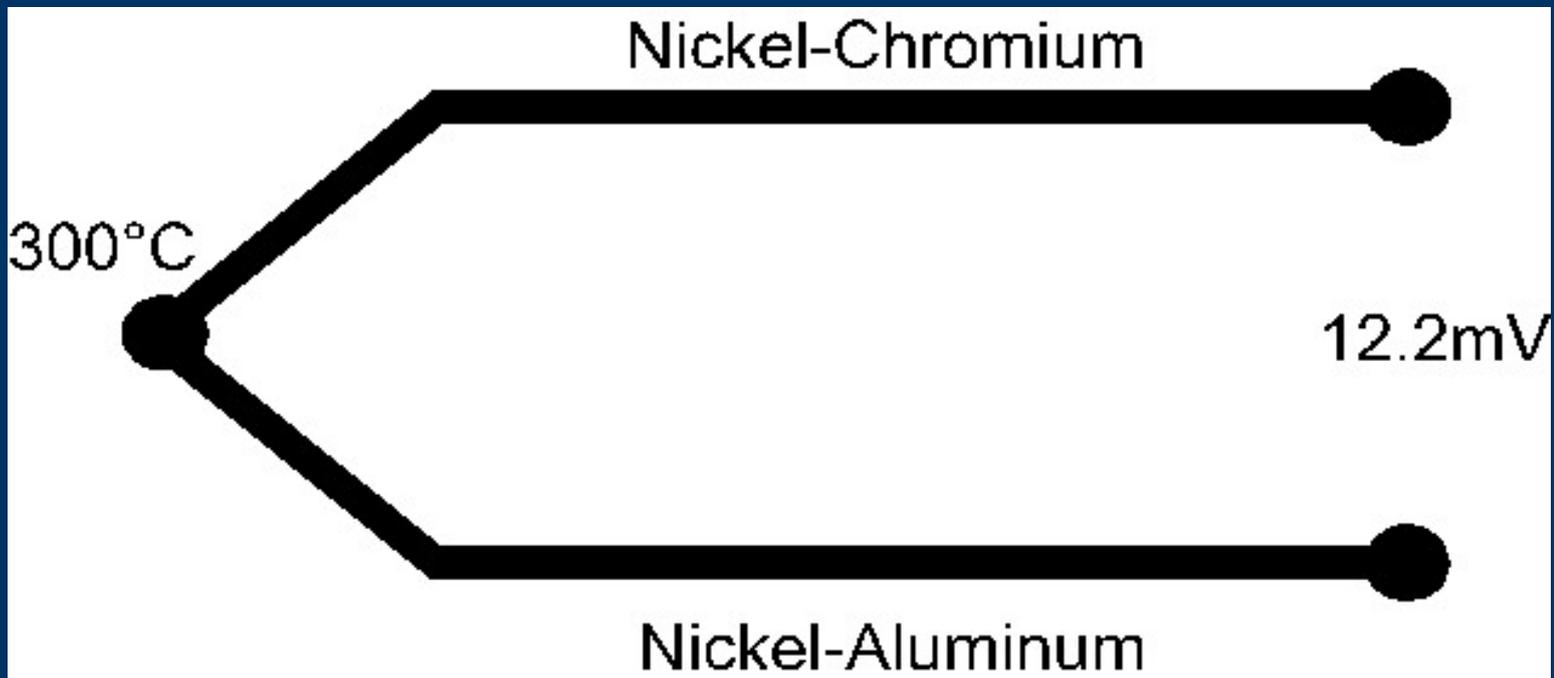


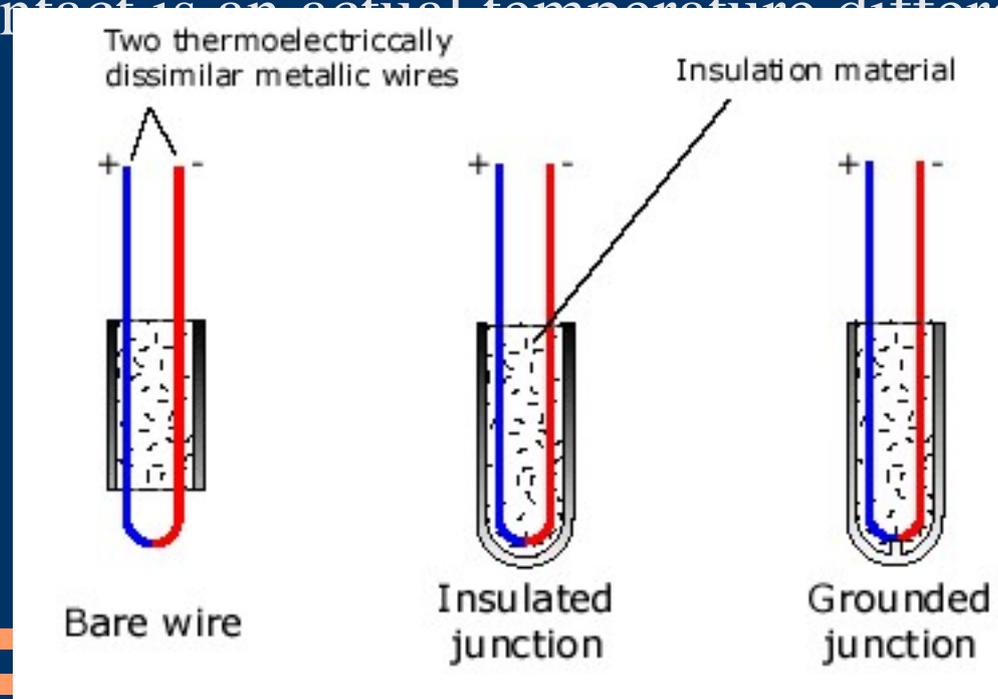
# Thermocouple



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# *What is a thermocouple?*

A thermocouple is a small thermoelectric device, or sensor that is used to measure temperatures accurately. The thermocouples are made from two different metals that are joined so that a potential difference generated between the points of contact is an actual temperature difference between the points.



# *How Does it Work?*

A voltage is created that can be correlated back to the temperature, when the junction of the two metals is heated or cooled. It is then measured and interpreted by the thermocouples thermometer. Not only is it measured in degrees Celsius, but also in microvolts. The four commonly used metals or calibrations are J, K, T, and E. These thermocouples can be used up to 1,000 ° C. Each wire have their own temperature range, so it depends on the area to determine the proper wires.

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# *Tools Needed*

- J wire --> metals inside: Iron and Constantan
  - K wire --> metals inside: Chromel and Alumel
  - T wire--> metals inside: Copper and Constantan
  - Wire strippers
  - Thermocouple Module
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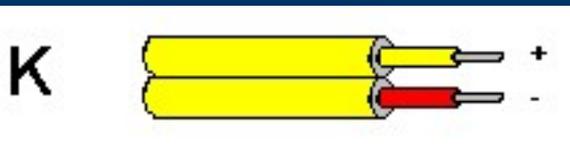
# *Getting Started*

1. Remove 1 inch of the outer sleeve on both ends of the wire.
2. Remove  $\frac{1}{2}$  inch of insulation from each lead on both ends.
3. On one end, twist both leads tightly together; the other end will be placed into the thermocouple module.

Repeat steps for each wire after collecting data.

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Temperature Ranges:

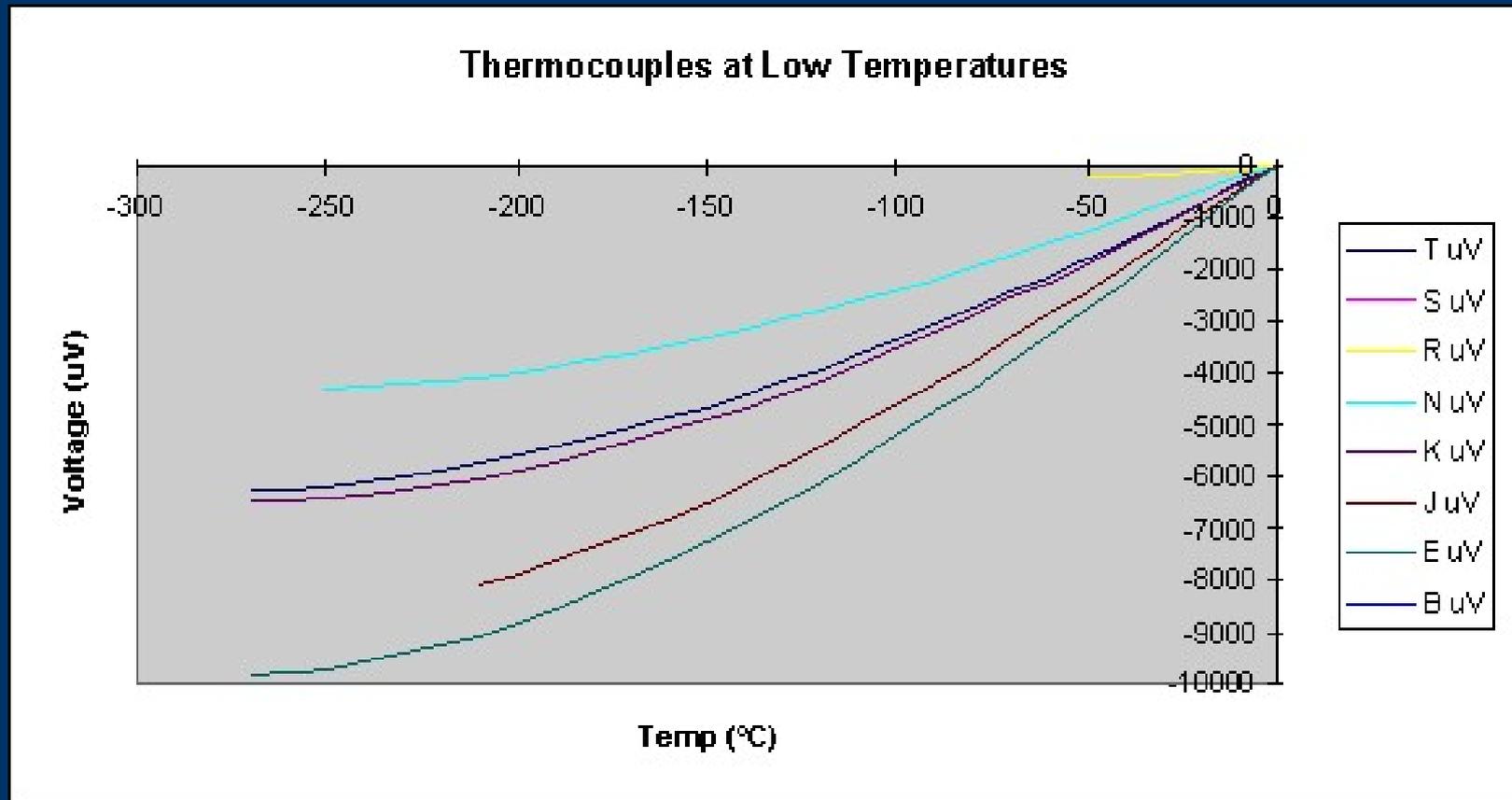
J- 95°C to 760°C

K- 95°C to 1260°C

T- -200°C to 350°C



# Basic Thermocouple Graph



# *Brief History*

In 1821, a man named Thomas Seebeck discovered an effect; when two different metals wires are joined, there will be a voltage made across the open end, which is proportional to the temperature difference between the joined and open ends. Through this, the establishment of voltage tables were able to correspond to the thermocouple junction temperature.

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# *Future Study*

There was only a limited amount of data because of a launch that took place this past weekend July 30- 31 2005. The data will be analyzed by the end of the week (August 5, 2005)



# *Acknowledgments*

Thanks to:

Dr. Shermane Austin

Medgar Evers College

NASA SHARP

NASA Goddard Space Flight Center at GISS



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