

Class: Physics II, Dates: Lab performed 2/10/2023

Lab 2: Introduction to Thermal Conductivity

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Abstract

1. Objective: Introduction to Thermal Conductivity

2. Introduction:

Thermal conductivity is a measure of the ability of a material to conduct heat. It is defined as the rate at which heat flows through a material per unit of time, per unit of cross-sectional area. The thermal conductivity of a material is determined by its molecular structure and the nature of the bonds between the molecules. Materials with high conductivity, such as metals, are good conducting heat and are often used as heat exchanges in heating and cooling systems. On the other hand, materials with low thermal conductivity, such as insulating materials, are used to reduce the heat transfer and improve energy efficiency in buildings and electrical systems.

3. Apparatus and Materials:

Conductometer

Wax chips

Candles

Stopwatch



4. Procedure and Results:

1. Place a molded paraffin ball in the dimple at the end of each rod.
2. Hold the conductometer with the paraffin facing downward.
3. All balls should be equal size.
4. Heat the center of the brass disc with a small, pointed flame.
5. Begin timing your trials now. You want to observe the pushpins as the way is heated

Record when they fall over for each metal rod.

It is important to heat the exact center of the brass disc.

Cooper (less than a minute)

Aluminum (1 minute).

Brass (1 min, 15 sec)

Nickel Silver (2 minutes)

Time that took for the paraffin to fall of each metal.

*Steel didn't fall because the flame wasn't in the middle due to air coming from the window. (Refer to fig.3)



6. Conclusions

The result of this thermal conductivity experiment can be used to compare the performance of different materials, evaluate their suitability for specific applications, and improve their thermal management properties.

7. Question:

If we try with a different metal, will it affect the time that the paraffin will fall?
Yes, each metal has its own conductivity.