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Lab 10

Introduction/Background

In this lab, David demonstrated, to us, how to measure dielectric constants of liquids using a coaxial probe. The process uses a coaxial probe to create fields in the material and then uses the reflection data to characterize the dielectric constant.

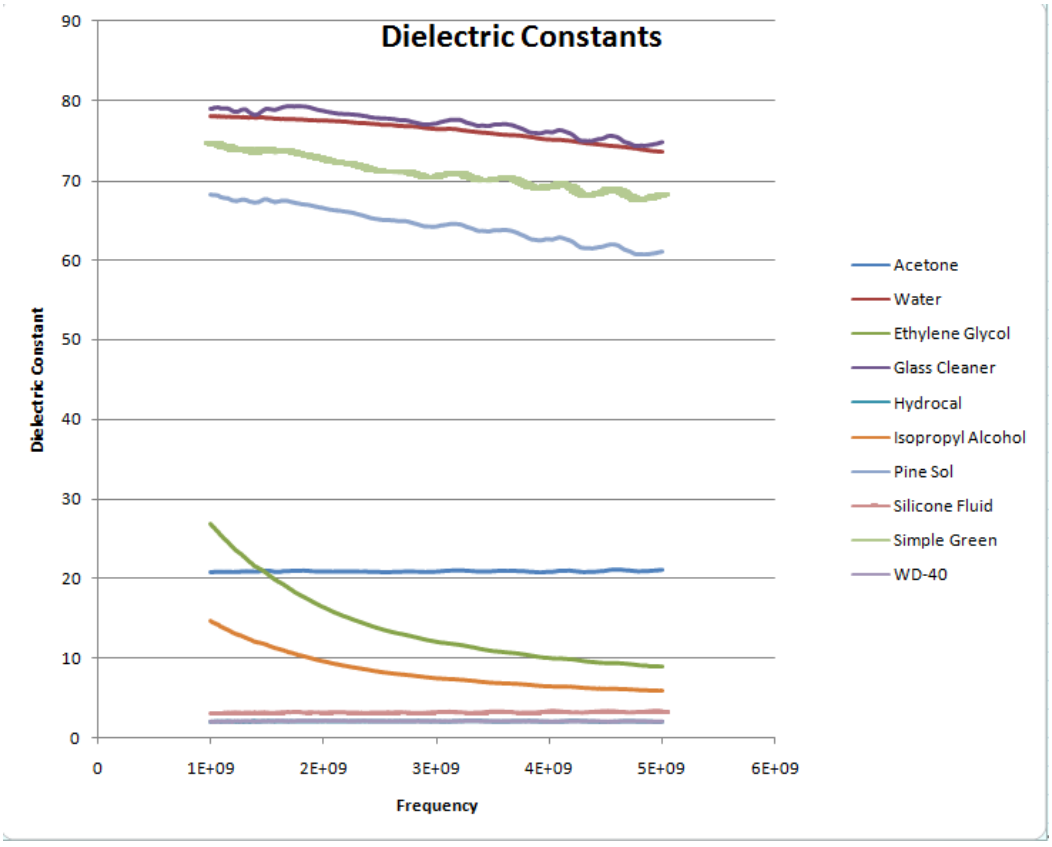
Design

There was no design stage for this lab.

In Lab Procedure

10 different materials were measured by David using the above mentioned coaxial probe process. The probe was first calibrated using water, the material with the highest dielectric constant that we measured, water, and a short. This calibration process was repeated between each material tested.

Results and Discussion



Conclusion

This lab gave us hands on experience with a useful and accurate method of measuring the dielectric constants of materials.

We used DI water as the calibration standard because it has an extremely high dielectric constant for a liquid. There are no other easily available liquids that have as high of a dielectric constant as DI water. Tap or seawater would not work due to the ions dissolved inside the water.

The calibration process could probably be improved somewhat by increasing the volume of the liquid being measured to lower the amount of electric fields leaving the material. The dielectric probe can be used for both wideband and narrowband measurements.

Hindsight

I should have brought an energy drink to measure its dielectric constant.

Reflection

The most rewarding part of this lab was seeing the wide variety in the dielectric constants of fairly common liquids.