Agilent Technologies Test & Measurement

Material Characterization Demonstration with the Agilent N9918A and 85070E

Clients: Mark Hanni, Ph.D. – Inside Application Engineer
Arthur Lizotte – Online Technical Support Manager, Americas Technical Contact Center

Background

Agilent Technologies offers a wide variety of tools available for the characterization of the dielectric properties of materials, including liquids. These tools are quite capable and flexible in their possible application. Having good demonstrations of the custom applications that are possible utilizing these tools provides a strong competitive advantage.

Description

For this project, students will be performing the following:

- Develop a program that will identify a *mystery* polar liquid, from a set of five or six possible liquids, by referencing the mystery liquid's measurements to a database of pre-measured known samples.
  The program must:
  - Be able to acquire dielectric property measurement results either directly through the 85070E software interface or by importing a previously created measurement file. An example data file can be made available.
  - Be able to determine the Debye relaxation model parameters by curve fitting dielectric measurement data.
  - Provide a best guess as to what a given measured liquid is by comparing to a set of reference data.
  - Be able to control the Agilent 85070E software to perform a permittivity and loss factor measurement on a sample set of liquids. This task will entail
    - Performing measurements using a network analyzer (N9918A)
    - Utilize the 85070E program's COM interface for automation and control
    - Acquire measurement data through the COM interface
    - Perform curve fitting to analyze and determine the polar model properties of a liquid measurement data using a standard polar liquid model (e.g. the Debye relaxation equation, the Cole-Cole equation, Havriliak-Negami equation, or Cole-Davidson equation)
    - For reference liquids the software must be able to store the polar liquid model properties in a self-contained (local storage) database for future recollection.

Desired Skills/Aptitudes

- Programming language can be student's choice. However, C++, MATLAB, or VEE would be preferred.

What's in it for you?

- You'll get to work with the latest technology from one of the industry's largest names in electronic test and measurement.
- You'll obtain a broad understanding of dielectric property measurements and materials characterization.
- You will get to interact with hardware via software. You will be instructing instrumentation and other software packages to actually perform operation and acquire data.

Location - Location is flexible. We expect that a visit may be desirable to our location at: 9780 S Meridian Blvd, Englewood, CO 80112