DLP® Near-Infrared Spectrometer for Optical Analysis of Liquids and Solids

About Test Results

The DLP Near-Infrared (NIR) Spectrometer reference design utilizes Texas Instruments' DLP technology in conjunction with a single-element InGaAs detector to deliver high performance measurements in a portable form factor that is more affordable than expensive InGaAs array detector or fragile rotating grating architectures. This design features multiple TI components, highlighted by the DLP 0.45" WXGA NIR chipset, which incorporates the DLP4500NIR DMD and DLPC350 controller.

The spectrum data contained below was measured from one DLP NIRscan™ evaluation module (EVM) to provide an example from a typical unit. The spectrum data was acquired using the EVM's 'Simple Scan' mode, which was configured for 453 data points across a wavelength range of 1327nm to 2500nm and captured with a 2.5s total scan time. Please note, performance will vary between EVMs due to variations in manufacturing and reference spectra from the user's catalog of spectral characteristics. The performance data is not guaranteed.

DLP NIRscan Evaluation Module

Related Documentation From Texas Instruments

DLPC350 Data Sheet: *DLP Digital Controller for Portable Advanced Light Control*, TI literature number DLPS029
DLP4500NIR Data Sheet: *DLP 0.45 WXGA Near-Infrared DMD*, TI literature number DLPS032
User's Guide: *DLPC350 Programmer's Guide*, TI literature number DLPU010
Application Note: *DLP*® for Spectroscopy, TI literature number DLPA048

If You Need Assistance

Refer to the DLP and MEMS TI E2E Community support forums

Spectrum Analysis

This chapter provides test data of wavelength absorbance spectrums from six commercially available samples.

When a spectrum is captured, the output can be used to:

- Identify an unknown material by comparison to a catalog of spectral characteristics
- Determine the presence of a substance of interest
- Inspect a quantity of material to determine concentration limits of certain substances
- Analyze the chemical composition of a sample using PCA (Principal Component Analysis) and Chemometrics

To measure the absorbance of these samples, the following procedure is used:

1. From the home screen of the DLP NIRscan GUI, select 'Simple Scan'.
2. Ensure no object is in the transmittance sampling device, and select 'Set New Reference'. The system scans the lamp spectrum which will be the reference for the measurement
3. Enter a scan name for the material to be scanned for easier retrieval later, place the sample into the transmittance sampling device, and select 'Perform Scan'.
4. An output graph of absorbance is shown on screen, from which you may download the spectrum data and/or perform additional scans.

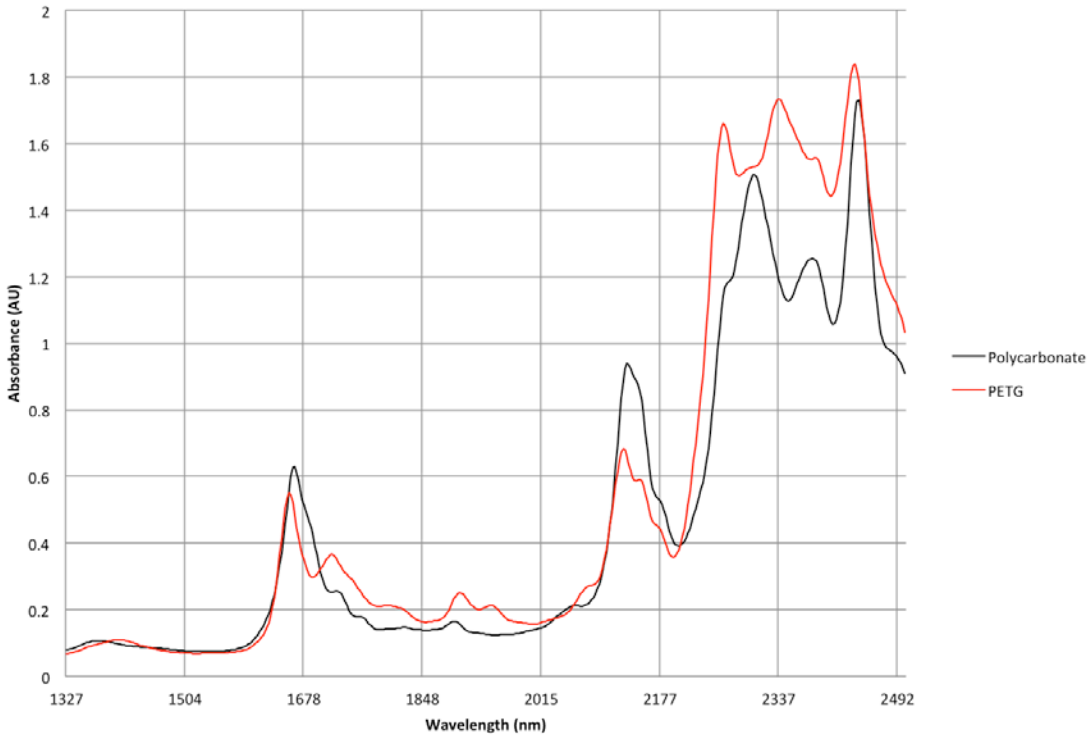

Figure 1. Wavelength Absorbance Spectrum Comparison of Polycarbonate and PETG

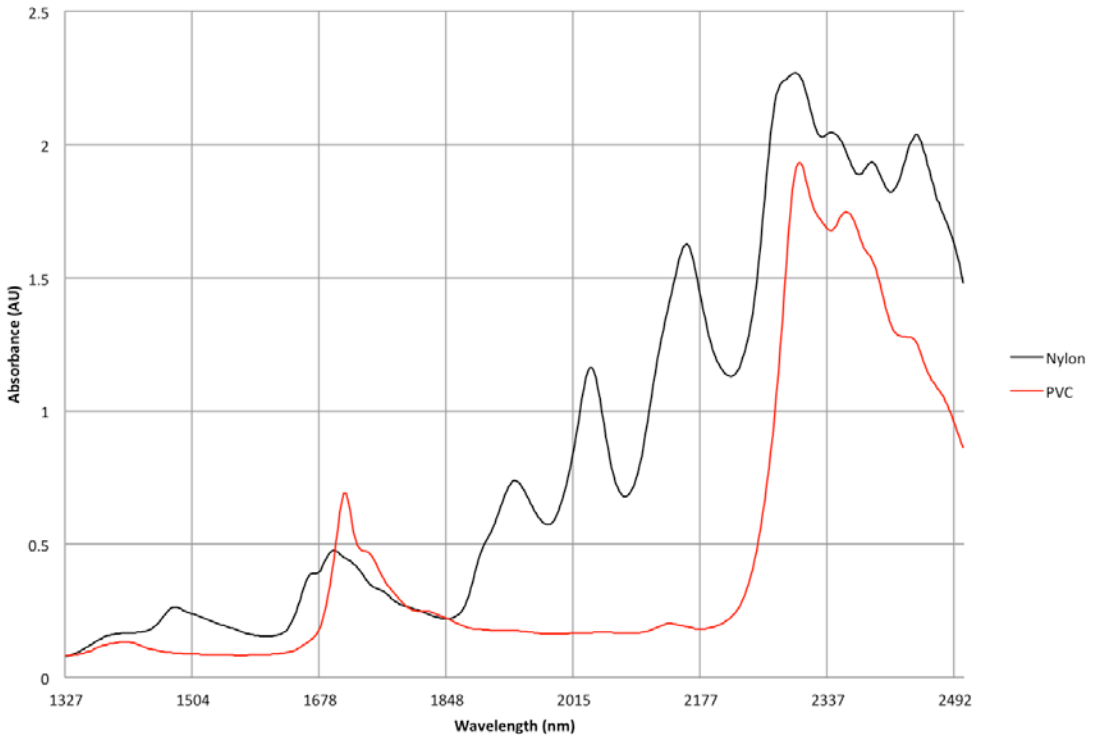

Figure 2. Wavelength Absorbance Spectrum Comparison of Nylon and PVC

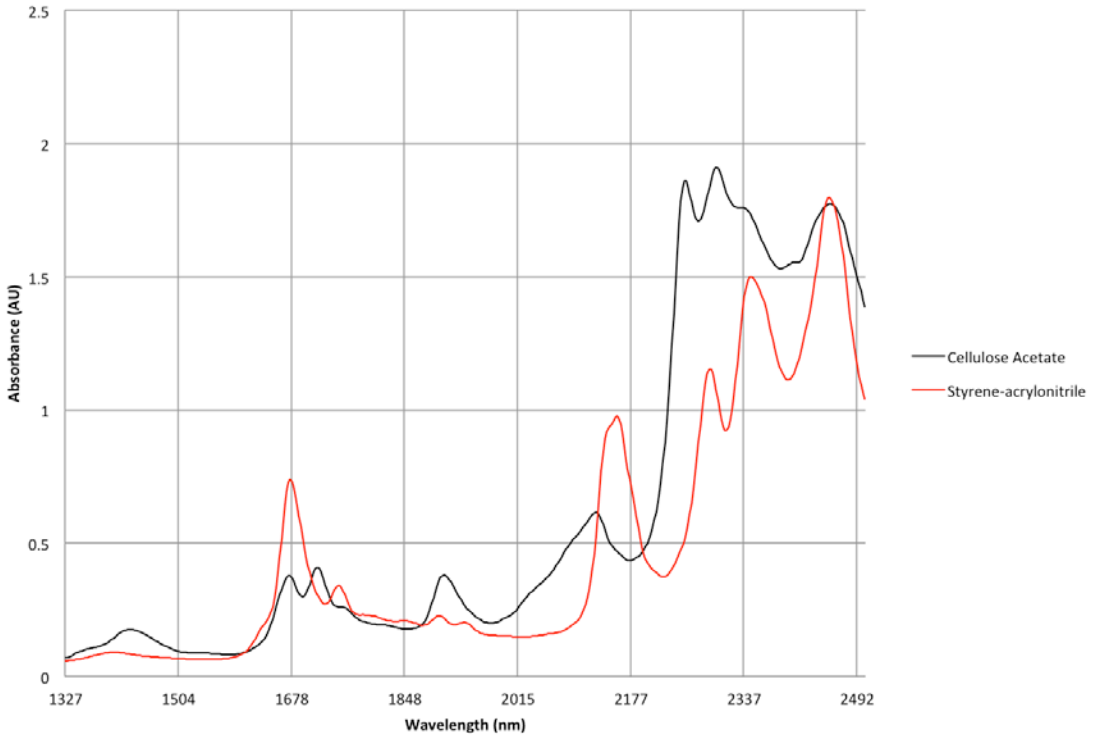

Figure 3. Wavelength Absorbance Spectrum Comparison of Cellulose Acetate and Styrene-acrylonitrile

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