MC2750 EP-NIR: Scan to Scan Wavelength Reproducibility.

SUMMARY: *the following Technical note demonstrates the scan-to-scan wavelength reproducibility of the Aspectrics MC2750 EP-NIR spectrometer. Examination of the residual spectra of 10 NIST1921a traceable polystyrene sample confirms the superior wavelength reproducibility of the Aspectrics EP-NIR technology. Examination of the residual spectra of the second order derivative of these same 10 spectra further confirms the MC2750's scan-to-scan wavelength reproducibility.*

An Aspectrics MC2750 Encoded Photometrics Near Infrared (EP-NIR) spectrometer covering the 1375-2750 nm spectral range for access to combination bands information was tested for scan-to-scan wavelength reproducibility, a problem known to affect other grating monochromator-based instruments.

Optical configuration was an open beam using the Aspectrics Near IR sampling bench. Single beam spectra of a NIST 1921a traceable polystyrene (PS) were collected over an integration time of 30 s.

10 overlaid spectra of the thick Polystyrene sample are shown in Fig 1. Spectra # 2-10 were subtracted from the first spectrum in the series to produce residual spectra and evaluate wavelength reproducibility between spectral runs. But for a slight baseline variation (expected when placing the PS film sample in-and-out the sample holder in the optic bench between 2 assays), no significant artifact indicative of lack of wavelength reproducibility was observed. In order to further test the hypothesis, second order derivative spectra (Fig. 2) and subsequent residuals spectra (Fig. 3) were calculated. Again this test shows extreme wavelength reproducibility between spectra. The EP-IR is able to achieve this high level of reproducibility due to it's fixed grating monochromator.

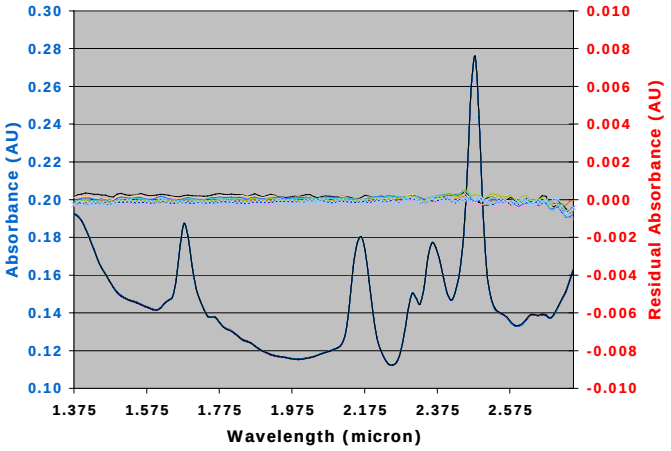

Fig. 1: 10 EP-NIR absorbance spectra of a NIST 1921a traceable polystyrene standard (left Y-axis) and residual spectra of spectra # 2-10 compared to the first assay (right Y-axis.)

Please note: except for a slight (expected) baseline variation due to placing the polystyrene film sample in and out the sample holder in the optic bench between 2 assays, no spectroscopic aberration attributable to lack of wavelength reproducibility is observed.

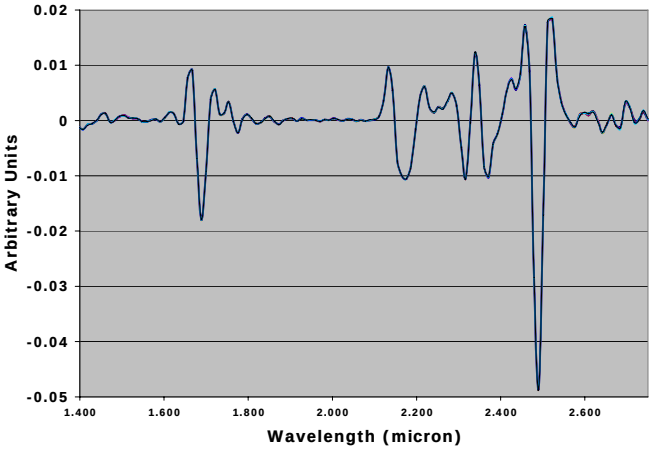

Fig. 2: Second order derivative of 10 EP-NIR absorbance spectra of a NIST 1921a traceable polystyrene standard.

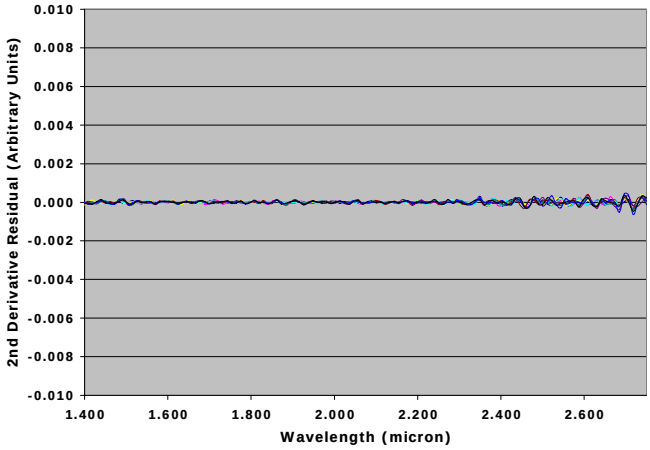

Fig. 3: residual spectra of second order derivative EP-NIR spectra of a NIST 1921a traceable polystyrene standard assays # 2-10 compared to the first assay.

Aspectrics, Inc. (Headquarters & Manufacturing)
6900 Koll Center Parkway, # 401
Pleasanton, CA 94566
Tel.: 925.931.9270
Fax: 925.931.9272

www.aspectrics.com

Aspectrics, Inc. (Applied Science & Technologies)
3510 Parmenter Street
Middleton, WI 53562
Tel.: 608.831.2507
Fax: 847.235.3130