

APPLICATION NOTE

On-Line Monitoring of Water in Ethylene Glycols with a ClearView db Photometer

Purpose

To determine water content in ethylene glycol (EG) without sample temperature control.

Experimental

Our LAB NIR-O™ spectrometer was used to measure the NIR spectra of 0 to 100% water in EG in the 18-43°C temperature range using a 10 mm pathlength SST™ probe. The resulting data were then use to define the wavelengths for our on-line ClearView® db process photometer.

Results

The resulting spectra are shown in Figure 1 for 5 concentrations ranging from 0-100% water in EG, each at 20, 25, 30, 35, 40 and 45°C. A multiple linear regression was performed, see Figure 2. Excellent linearity ($R^2 > .9999$) is achieved using 4 wavelengths in the range tested showing data at all temperatures.

Conclusions

Our ClearView db photometer with 4 filters can be used to determine water from 0-100% in ethylene glycol using a 10 mm optical path insertion probe, or a flow cell (for a slip stream) on-line. The ClearView db can be configured with 4-20 mA analog outputs (6 answers max on a single channel system, and 4 per channel on a dual channel system) and corresponding contact closure outputs to alert error states. Modbus communication over Ethernet is also standard.

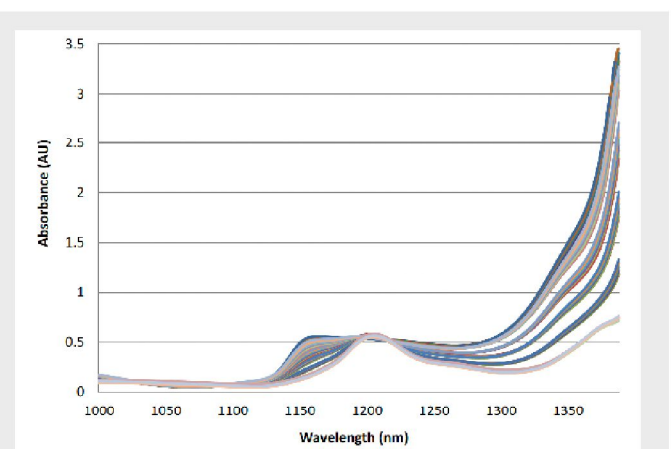


Figure 1: Spectra of Water: Ethylene Glycol Mixtures at Various Temperatures

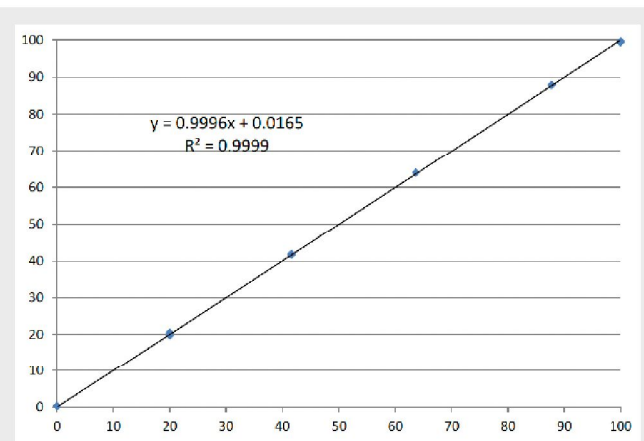


Figure 2: Actual vs Predicted % Water in Ethylene Glycol



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