

Application Note:

On-Line Monitoring of Water in Acetic Acid with a ClearView® db Photometer

Purpose: To determine water content in acetic acid with sample temperature correction.

Approach: A full spectrum NIR spectrometer was used to measure the spectra of 0-15% water in acetic acid at various temperatures in a 5 mm cuvette cell.

Results: The resulting spectra are shown in Figure 1. Minimum temperature sensitivity is found at 1420 nm. (vertical line). Excellent linearity is achieved (see Figure 2) in the range tested, up to 15% water. The ClearView db is able to measure water in acetic acid to better than 0.1% under isothermal conditions. The absorbance of water is known to change as a function of temperature, and this will change the reported water content. This relationship is shown in the graph in Figure 3. Changing the temperature by 5 °C changes the absorbance by about 10 mAU. By measuring the sample temperature with an RTD element, bringing the signal back into the ClearView db (through an intrinsic safety barrier for hazardous environments), and including a temperature coefficient in the ClearView db, a calibration precision of 0.05-0.1% water in acetic acid can be achieved.

Conclusions:

ClearView db photometer with sample temperature correction can achieve 0.1% precision for the measurement of water in acetic acid on-line.

ClearView db

Class 1, Div 1
(Ex/d IIB) Enclosure

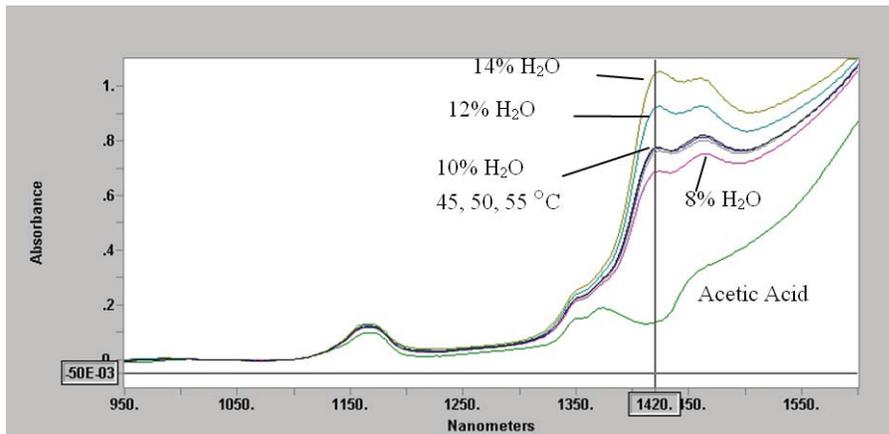


Figure 1

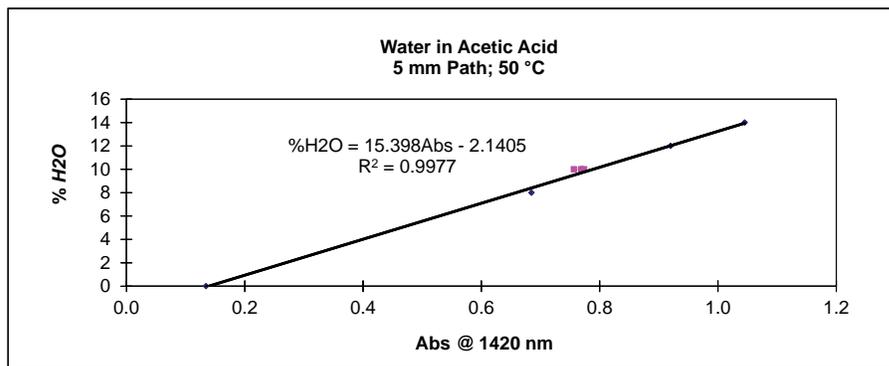


Figure 2

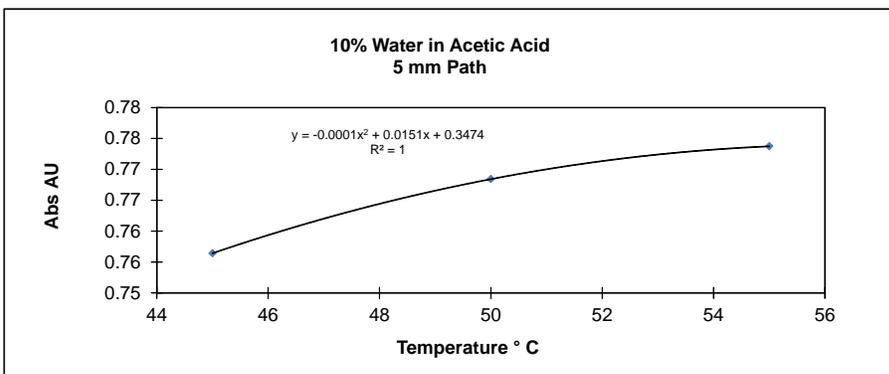


Figure 3