

Photometric accuracy of internal DRAs in the UV-Vis region using certified potassium dichromate solution

Data Sheet

Introduction

Photometric accuracy is important for many applications of UV-Vis instruments. It is defined as how accurately an instrument measures absorbance, and is critical in every analytical measurement. When comparing the results for a sample measured on different instruments, it is essential to know the accuracy of each instrument before useful analysis and comparisons can be made.

Photometric accuracy is part of the standard test required by many regulatory bodies including the Pharmacopoeias, and is typically performed on the spectrophotometer. When using accessories such as diffuse reflectance accessories (DRAs) which have in-built detectors, it is important to determine the photometric accuracy of the whole system. This test uses a standard potassium dichromate solution to demonstrate the photometric accuracy of the New Generation Cary 4000/5000/6000i spectrophotometers with the Agilent DRA.



Cary 4000, 5000 and 6000i instruments provide excellent photometric accuracy



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Materials

- Cary 4000, 5000 or 6000i spectrophotometer with a DRA
- DRA cuvette holder, part number 0210187900
- Standard potassium dichromate solution, Starna standard kit part number 9910085200

A Cary 5000 with an Internal DRA 2500 Internal was used for this experiment.

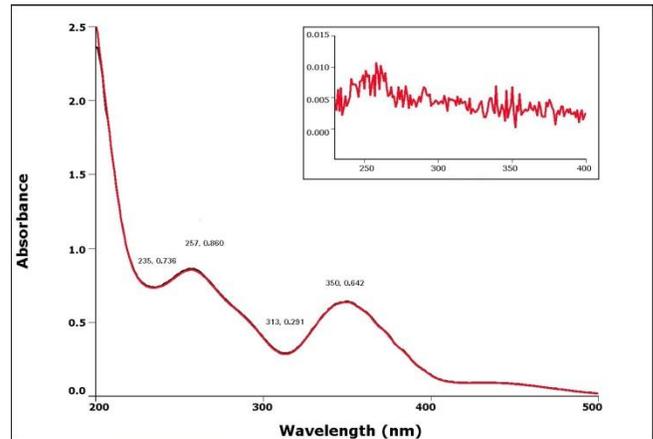
Method

1. Warm up the Cary spectrophotometer for at least 1 h prior to use.
2. Calibrate the DRA by running the Auto-calibrate feature in the Validate application.
3. Mount the cuvette holder over the transmittance port of the DRA and ensure that the DRA is aligned.
4. Set up the instrument as follows:
 - Wavelength range: 200–800 nm
 - Scan rate: 60.0 nm/min with a data interval of 1.0 nm, signal averaging time 0.1 s
 - SBW: 1.5 nm
 - Zero/Baseline correction: ON
 - All other parameters: default
5. Perform a Zero/Baseline correction on the blank solution.
6. Remove the blank solution and then measure the standard potassium dichromate solution.
7. The expected values and tolerances of the standard potassium dichromate solution can be obtained from the Certificate of calibration and traceability.

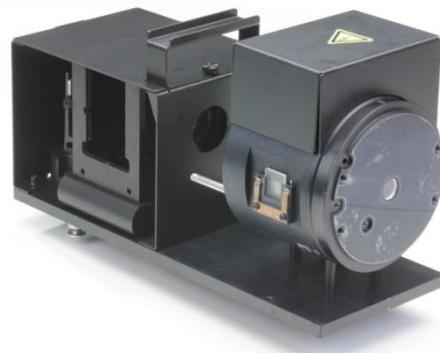
Results

The spectrum of the standard potassium dichromate solution measured with the DRA can be seen below. It is overlaid with a spectrum of standard potassium dichromate solution collected on the instrument. The measured absorbance of the potassium dichromate solution on the DRA compares well with the measured

absorbance of the standard on the instrument. It also corresponds well to the certified values at the selected wavelengths. The values below are well within the acceptable error of 0.01 absorbance.



Wavelength (nm)	Certificate Value (Abs)	Agilent DRA (Abs)	Difference (Abs)
350	0.638	0.642	0.004
313	0.289	0.291	0.002
257	0.859	0.860	0.001
235	0.738	0.736	0.002



The Internal Diffuse Reflectance Accessory

Conclusion

This method demonstrates the excellent photometric accuracy of Agilent DRA and the New Generation Cary spectrophotometers.

Reference

Solution Validation Test kit, part number 9910085200

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