

SPECTROSCOPY CONFIGURATIONS FOR UV-VIS ABSORBANCE APPLICATIONS



INTRODUCTION TO UV-VIS ABSORBANCE APPLICATIONS

Absorbance spectroscopy performed in the ultraviolet (UV) and visible (Vis) light range is a highly versatile measurement technique that is incredibly popular in analytical chemistry, as well as in many other fields. This method is based on the Beer-Lambert law, which states that the light absorbed by a sample is directly proportional to the concentration of that sample. By utilizing reference data, UV/Vis absorbance spectroscopy enables both quantitative and qualitative measurements across a wide spectrum of applications, from analyzing blood parameters to determining chemical compositions.

In chemical analysis, UV/Vis absorbance spectroscopy is used for concentration determination by measuring the absorbance at specific wavelengths, as well as for identifying compounds based on their unique absorbance spectra.

The typical UV/Vis system requires a spectrometer, light source, fiber optic cable, and a sampling accessory, however, Avantes' modular platform allows us to design the ideal system to include either a single broadband instrument or several working in tandem at different wavelengths.

- Size/portability – enabling integration into handheld devices
- Value – these instruments often have a superior price/performance ratio
- Micro-sampling – through the use of fiber optic sampling
- Speed – Micro spectrometers can support sampling at very high speeds (ms time scales)
- Non-invasive/non-contact sampling

For these reasons and more Avantes instruments are often considered for integration into commercial systems for UV-Vis Absorption measurements to support numerous industry applications.

UV-VIS ABSORBANCE CONFIGURATIONS WITH PROBE

Absorbance UV-vis spectroscopy benefits from the versatility of fiber optic-based spectrometers, particularly in the provision of probe-based fluorescence. These probes offer flexibility in size and shape, enabling direct sample measurement. They are adaptable to various conditions and confined spaces, making it feasible to conduct measurements in harsh environments or tight quarters, with the added advantage of remote operation. Handheld configurations with sample probes further extend the accessibility of this technique.



Spectrometer
[AvaSpec-NEXOS™](#)
Replaceable slit technology (190-1100 nm; slit-XX recommended)



Light Source
[Avalight-DHc](#)
Deuterium Halogen Light Source with TTL Shutter



Dip Probe
[FDP-7UVIR200-2-yy](#)
Transmission dip probe with replaceable tips of various pathlengths

EXAMPLES OF UV-VIS ABSORBANCE APPLICATIONS



Analytical Chemistry



Hematology/Proteomics



Air Pollution Monitoring



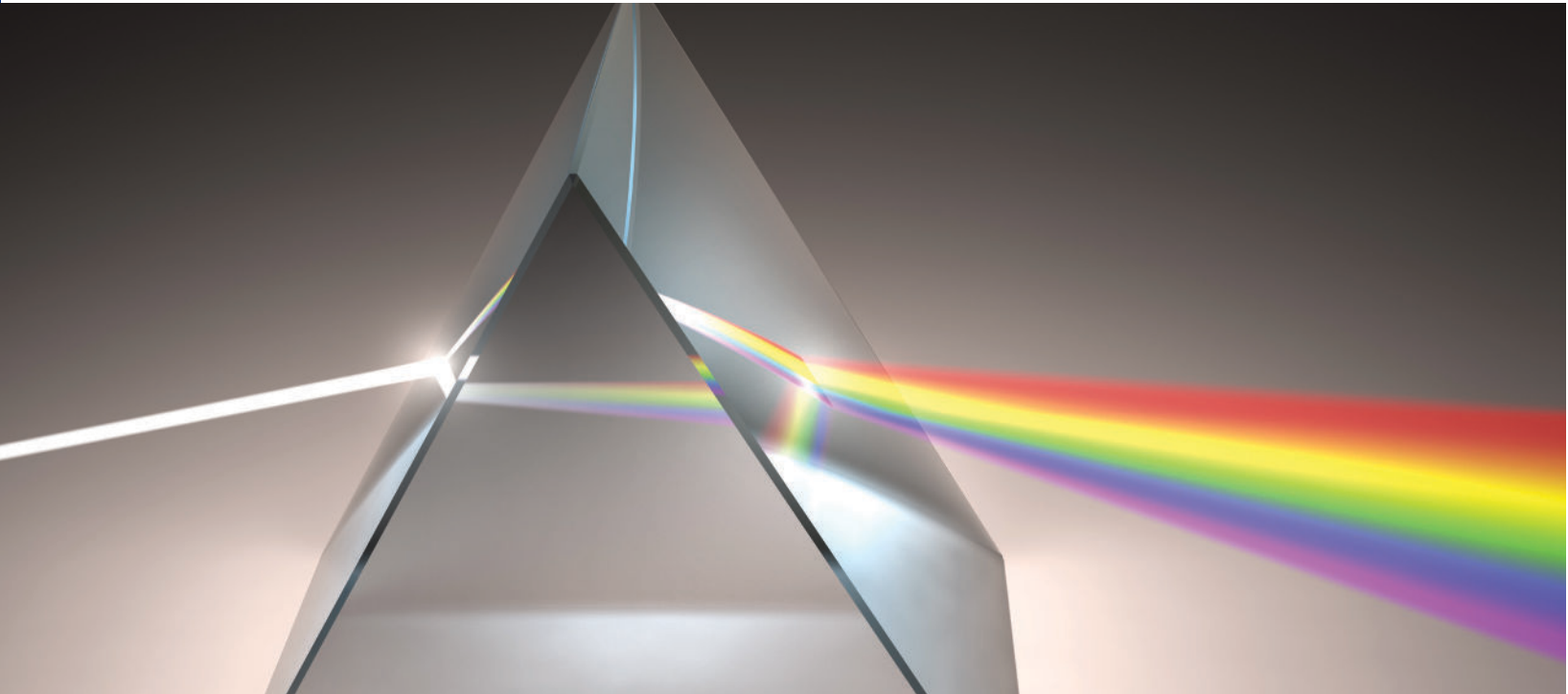
Pharmaceutical



Water and Soil Analysis



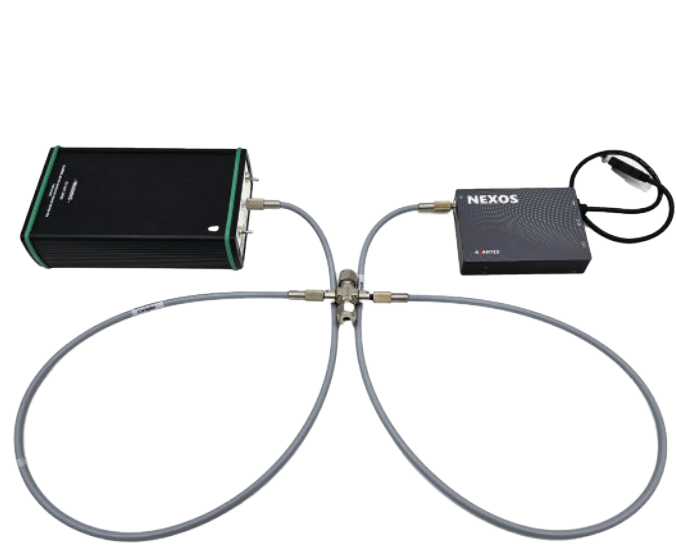
Color Analysis







UV-VIS ABSORBANCE SETUP WITH FLOW CELL

A flow cell is essential in UV-vis absorption spectroscopy because it allows continuous and consistent delivery of liquid samples. This setup enables real-time monitoring of reactions or processes, ensures fresh sample exposure to the light beam for accurate measurements, and prevents issues like settling or degradation of static samples.

OPTION 1: SETUP WITH DHC LIGHT SOURCE







-  **Spectrometer**
[AvaSpec-NEXOS™](#)
Replaceable slit technology (190-1100 nm; slit-XX recommended)
-  **Light Source**
[Avalight-DHc](#) Deuterium Halogen Light Source with TTL Shutter
-  **Fiber Optics**
[FC-UVIR600-1-MS](#) 600 micron core broadband fiber optic cables
-  **In Line Flow Cell**
[Flow-Cell-1/4"](#) - with variable SMA adapter, 10 mm path length, including 2 UV/VIS/ NIR lenses. Microliter volume flow cells also available

UV-VIS ABSORBANCE CONFIGURATION WITH CUVETTE

A collimating lens holder is needed in UV-vis absorption spectroscopy to ensure that the light passing through the sample is parallel, which improves the accuracy and consistency of the measurements. Collimated light prevents the spreading or divergence of the light beam, allowing for precise detection of the amount of light absorbed by the sample at various wavelengths




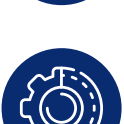
OPTION 1: SETUP WITH DIRECT ATTACH CUVETTE



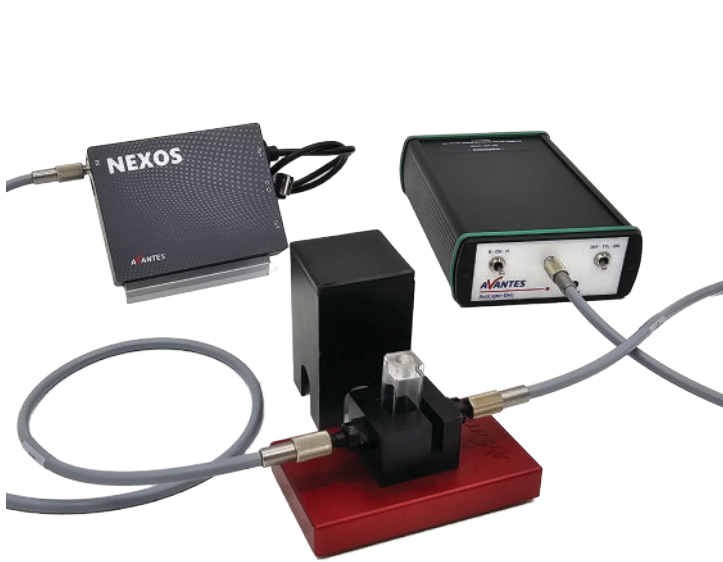
-  **Spectrometer**
[AvaSpec-NEXOS™](#)
Replaceable slit technology (190-1100 nm; slit-XX recommended;)
-  **Light Source**
[Avalight-DHc](#) Deuterium Halogen Light Source with TTL Shutter
-  **Fiber Optics**
[FC-UVIR600-1-MS](#) 600 micron core broadband fiber optic cables
-  **Direct Attach Cuvette Holder**
[CUV-DA](#) - 10 mm cuvette holder for Avalight-DHc incl. COL-UV/VIS lens and 2 mirrors



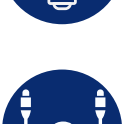

OPTION 2: SETUP WITH XE-MINI LIGHT SOURCE



-  **Spectrometer**
[AvaSpec-NEXOS™](#)
Replaceable slit technology (190-1100 nm; slit-XX recommended)
-  **Light Source**
[Avalight-XE-Mini-HP](#) pulsed xenon light source and interface cable
-  **Fiber Optics**
[FC-UVIR600-1-MS](#) – 600 micron core broadband fiber optic
-  **In Line Flow Cell**
[Flow-Cell-1/4"](#) - with variable SMA adapter, 10 mm path length, including 2 UV/VIS/ NIR lenses. Microliter volume flow cells also available

OPTION 2: SETUP WITH IN LINE CUVETTE



-  **Spectrometer**
[AvaSpec-NEXOS™](#)
Replaceable slit technology (190-1100 nm; slit-XX recommended)
-  **Light Source**
[Avalight-XE-Mini-HP](#) pulsed xenon light source and interface cable to spectrometer
-  **Fiber Optics**
[FC-UVIR600-1-MS](#) 600 micron core broadband fiber optic
-  **Inline Cuvette holder**
[CUV-UV/VIS](#) Cuvette holder, 10 mm path-length

ALTERNATE SPECTROMETER OPTIONS

VARIUS™

This instrument is ideal for high-speed data transfer applications due to its USB3 and Gigabit Ethernet connections.



AVASPEC-ULS2048X64

This instrument is perfect for applications requiring higher sensitivity in the UV and NIR ranges, thanks to its 2048x64 back-thinned detector.



SUPPORT & ADVICE

Providing high-quality equipment is only part of what we do. The other equally important factor is the high level of service we deliver. Our organization includes various specializations to provide you with the best service and advice:

Feasibility studies

Our sales engineers perform feasibility studies to find the right solution.

Support team

Our support team never sleeps and provides you with the best service.

Demo program

Our demo program allows you to try our products for free to ensure you find the perfect solution.

MyAvantes

Personal platform where you'll find AvaSoft Software and other material.

Online support

Helpful documents and tutorial videos for extra help with your products.



ALTERNATIVE CUSTOMIZATION OPTIONS

AVALIGHT-HPLED

This light source is ideal if you have an application requiring measurements over a limited spectral range.



CUVETTE HOLDER

This temperature-controlled cuvette holder is ideal for applications needing precise sample temperature control.



ABOUT AVANTES

Avantes is the leading innovator in the development of fiber-optic spectroscopy instruments and systems with nearly 30 years of experience developing customer-defined configurations.

With a long history of consulting with clients across diverse industries and applications, Avantes is an experienced partner, equipped to guide customers who want a solution tailored to their application and research needs. By building worldclass spectrometers and providing second-to-none customer service, Avantes offers customers the peace of mind that the Avantes solutions they purchase will meet, and exceed, their expectations.

Through our headquarters in Apeldoorn, the Netherlands and offices in the USA and China, our sales engineers work closely with our customers to recommend the optimal measurement solution. In addition to our direct offices, Avantes has a worldwide network of distributors in over 35 countries who are ready to assist you. Our production team, which is located at our headquarters in the Netherlands, is dedicated to quality workmanship and has a relentless drive to exceed customer expectations.

Curious how spectroscopy can help you reveal answers by measuring all kind of materials in-line at your production facility, in a lab or in the field? Please contact one of our technical experts, we are happy to help!



CONTACT

WE'RE HAPPY TO HELP

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