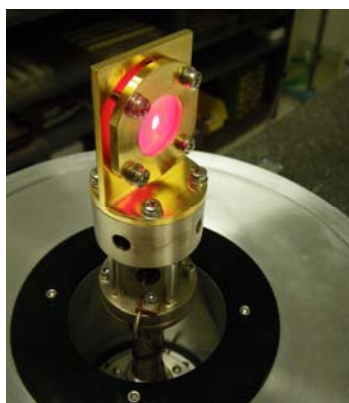


VUVAS 1000+PL Spectrophotometer for Deep Ultraviolet

Ultraviolet (UV) spectrophotometry has a well-deserved niche. Very few instruments optimize for the region between 120 and 400nm. Development and manufacture of ultraviolet lasers, optics, crystalline materials, phosphors for more efficient lighting, resonance Raman instruments, and other applications including fundamental research require a broadly useful instrument for analysis, optical characterization, and test. McPherson's new Vacuum Ultraviolet Analytical Spectrophotometer (VUVAS+PL) provides capability to measure transmission, reflection and excitation \ emission for samples that exhibit luminescence or fluorescence.

The McPherson VUVAS+PL instrument meets the requirements of deep and vacuum ultraviolet analysis in the 120 to 400nm range. It offers a clean, particulate free and tight, purge or vacuum capable enclosure. UV enhanced optics, sources, detectors, and a computer optimized optical system. All VUVAS+ elements are selected to improve analytical results and simplify measurement tasks for the user.



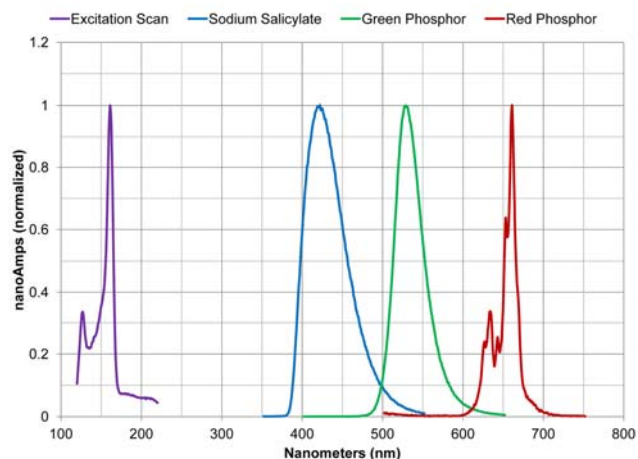
Optional Cold Head fitting VUVAS 1000+PL

The VUVAS+PL spectrophotometer works with solid samples and can be equipped with gas or liquid sample cells. Most users employ optic-like substrates coated with sample for transmission measurements. A three-position sample holder is standard. Cryogenic single-sample mounts and raster-mapping attachments for large samples are available as specials. Reflectance is readily measured, and angle of incidence to the sample surface is easily altered. Detector angle is also adjustable. It can maintain theta/2-theta geometry for specular reflectance measurements, or deviate from this, to measure scatter or dispersive samples.



The VUVAS 1000+PL Spectrophotometer

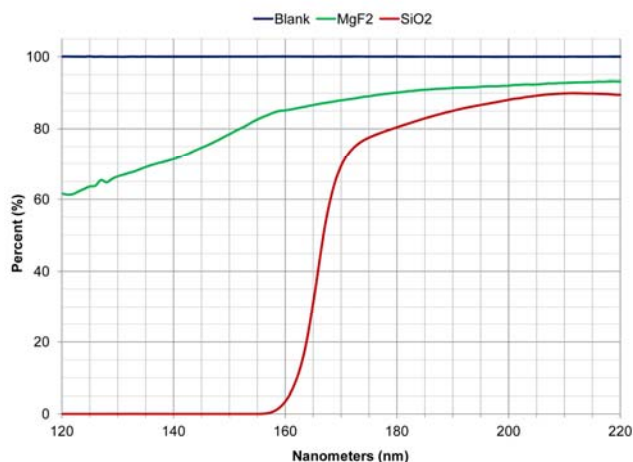
The wavelength region below 350nm has very few, if any, standard reference materials.¹ One reason is the energetic ultraviolet light materials must tolerate. There is also the sensitivity of samples to contamination. Contamination by monolayers of water, oxygen or oil has reportedly been responsible for transmission losses of 15% at 157nm². By design VUVAS+PL delivers absolute measurements. A single detector collects reference data as well as the final transmission or reflectance measurement. This approach enables users to qualify instrument performance, anytime and without extra accessories. The ability of the VUVAS+PL to prove spectral and photometric precision in-situ provides data with confidence.



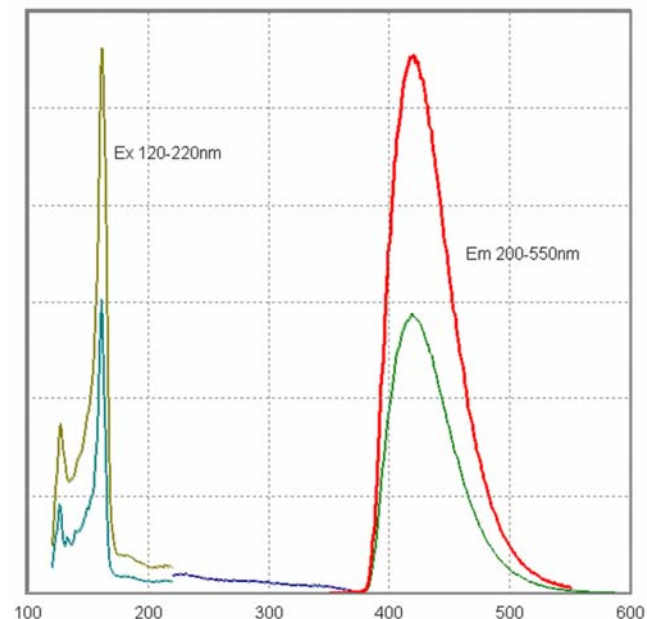
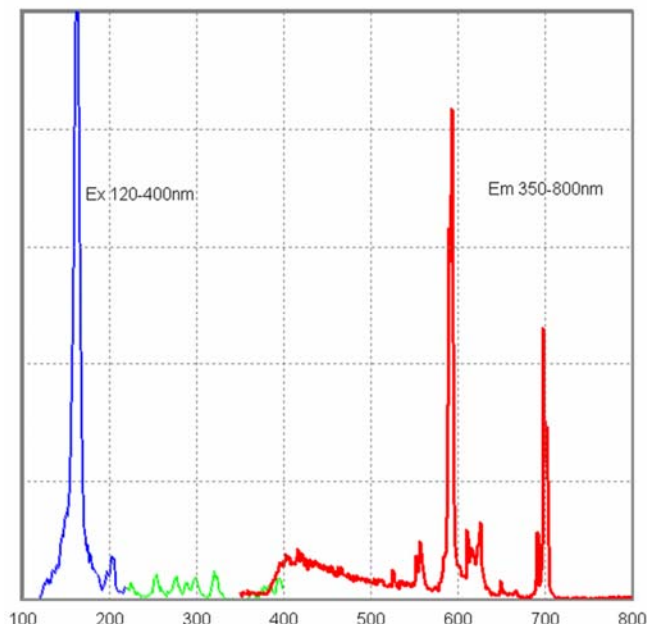
Example Excitation and Emission Data: Excitation scan in 120 to 220nm region together with normalized emission of three samples; sodium salicylate, green phosphor and red phosphor

The **VUVAS+PL** emission spectrometer operates from 140nm to 2600nm depending on the selected model; vacuum and atmospheric versions are available. It uses all reflective optics to collect emission at ninety degree angle and deliver signal – free from chromatic aberration – to the entrance slit of the emission spectrometer. The emission spectrometer may be optimized to detect signals into the near Infrared. Signal acquisition of the 400 to 800nm visible spectral region with resolution on order 0.2 nanometers full-width-half-maximum can occur in milliseconds using the charge-coupled device (CCD) detector. Accessories for persistence measurements are available too.

The VUVAS+PL system is an integrated and total solution. The one-touch vacuum (purge) control system and software allow users to perform high quality deep and vacuum ultraviolet measurements more easily and with higher confidence. It complements high performance UV/Vis instruments found in many laboratories and provides solid performance for the deep and vacuum ultraviolet region.



Example Transmission Data: Measurements demonstrating precision; the VUVAS makes 0.05%T RSD measurements at a fixed wavelength, e.g. 157nm. Wavelength scanning over the 120 to 320nm region results in data better than 0.3%T RSD. Overall instrument stability is better than 0.5%T per hour



References

1. John P. Hammond C.Chem MRSC, *New Certified Reference Materials for the determination of photometric accuracy in UV spectrophotometry*, Spectroscopy Europe 13(4) 2001
2. W. Pantely and D. Collier, *Taking the UV Challenge*, OE Magazine, October 2001

VUVAS 1000+PL Spectrophotometer for Deep Ultraviolet

