

Application-Specific System for UV LED Measurements



Technical Challenge

In the process of the development of LEDs, it is often necessary to measure their spectral flux. A client needed to test a series of LEDs that had a high UV light output. They asked Labsphere for a reliable, reusable light measurement system.

Labsphere's Solution

Measuring lights with substantial UV intensity creates several complications that require a more advanced system than is usually required; most importantly, the material needs to be robust and able to withstand high UV content. Labsphere's standard Optical Grade Spectralon® material can suffer reflectance degradation when exposed to abundant UV radiation. The final product was a 12 inch light measurement sphere with several application-specific features:

- Interior Extreme Physics and Vacuum (EPV) Spectralon lining
- Fiber optic connector leading into a spectroradiometer
- Auxiliary lamp and calibration lamp port
- Custom 3.5" light trap for use during calibration
- Sliding, lockable mounts on frame
- Two small, antipodal ports to be used for nitrogen purging

Shorter UV wavelengths (less than 200 nm) are absorbed by oxygen molecules in the atmosphere. This can be prevented with nitrogen purging, which creates a low-oxygen environment within the sphere. The inlet and outlet ports controlled the nitrogen flow to the sphere. Rather than choosing a different material, Labsphere vacuum-baked the Spectralon lining and assembled the sphere in a class 10,000 clean room. This process cleansed the material of any molecular contaminants and helped prevent reflectance degradation of the sphere's interior, ultimately providing more accurate results over a longer period of time.

Benefits

- The EPV Spectralon interior gives the system a longer performance lifetime:
 - Allows the client to rely on the system for accurate results over an extended period of time
 - Minimizes recurring replacement costs
- The nitrogen purging process reduces inaccuracies and widens the range of measurable wavelengths, improving testing efficacy
- Height of the system is easily adjustable, facilitating the process of exchanging DUTs and installing the light trap attachment
- The light trap makes calibrating the system easy and accurate

Client Request	System Feature
Can measure LED modules up to 3.5 inches in length	3.5 inch port hole on a 12 inch sphere
Manually adjustable to 12 inches above default height	Levers on both sides lock in sphere's position along shaft
Capable of withstanding exposure to UV sources	UV-resistant EPV Spectralon lining
Measures spectral output accurately and reliably	Nitrogen purging system minimizes inaccuracies

