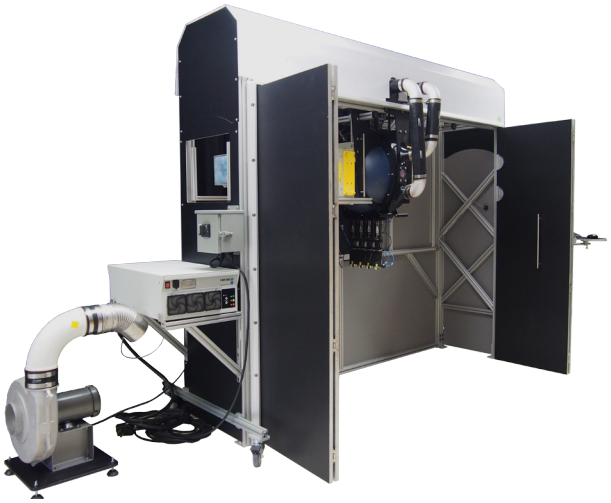
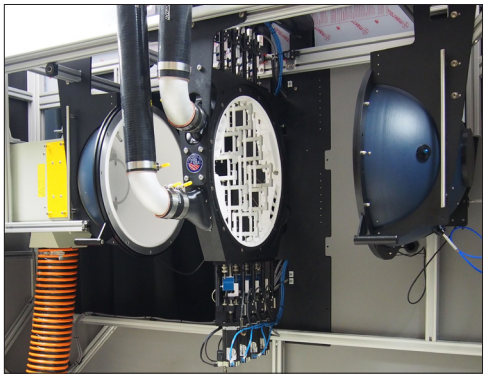
Ultraviolet Tensile Testing System





Technical Challenge

Certain materials testing procedures require putting a sample under extreme conditions or great stress to simulate any situation the material might be in. Exposing a material to high amounts of UV light for a short period can represent the effects of prolonged exposure to the sun. Labsphere was asked for a system that can subject numerous samples to tension and extreme UV irradiance within a controlled environment.

Labsphere's Solution

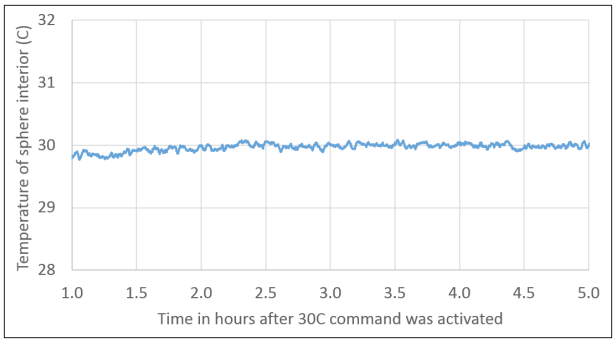
Incorporating a tensile testing system into an integrating sphere environment requires a delicate reworking of the standard geometry. The sphere was built in the shape of a pill, with two hemispheres and a cylindrical tensile testing assembly between them. With careful baffling and other unique features, the system still guarantees reliable test results:

- Eight sample holders each with individual load cell assemblies
- Rollers on each hemisphere for easy exchange of samples between tests
- UV light source capable of outputting irradiance equivalent to thirteen suns and continuously adjusting down to 20% of its full power
- Industrial blower and duct to prevent the light source from overheating
- Environmental control unit for setting the temperature within the sphere
- Sensors installed across the system for measuring oxygen levels, temperature, humidity, and irradiance within the sphere, and tension in each cell
- Custom software optimized for this application and system

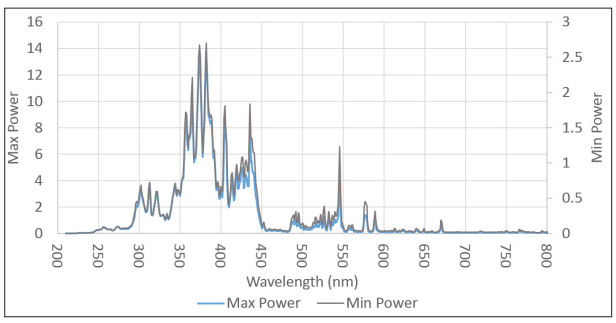
Benefits

- Multiple safety features ensure that no accidental exposure to the UV rays or extreme temperatures occur during or after testing
- The light source amply provides enough spectral radiance to meet the client's specifications, and its continuous adjustability makes a variety of testing environments possible
- Temperature control is accurate and stable, with only ±2°C between samples and ±.2°C overall temperature over four hours
- With eight sample holders, the testing process is highly efficient
- The software provides active monitoring of every sensor and individual control over each load cell, including sinusoidal and pull-hold-relax functions.
- The oxygen and humidity sensors provide additional information on the testing environment and give the client the option to incorporate oxygen and humidity controlling units in the future
- Full test reports were provided, including temperature control, software operation, load cell control, and irradiance calibration and stability

Temperature Stability at Full Power



Spectral Stability of Light Source



Labsphere
Advancing the Technology of Light: Measure. Create. Reflect.

PS-13167-UFJ-92478 Rev.01