

## **DETECTION DIVISION | Passive Standoff Branch Optical Spectroscopy Laboratory**

Located in the ECBC Advanced Chemistry Laboratory, the mission of the Optical Spectroscopy Laboratory encompasses investigations of the complex phenomenologies governing the interactions of light with the broad variety of materials that are of interest to the warfighter. We offer a suite of research-grade instruments ranging from the far-ultraviolet (UV) through the mid-infrared (IR) in a spectral range of 0.2-17  $\mu\text{m}$ . Available techniques include diffuse reflection, attenuated total reflection (ATR), specular reflection, transmission (vapor and condensed-phase applications), and IR microscopy. Two Labsphere integrating spheres UV/Vis/Near-IR and mid-IR offer the capability of measuring the hemispherical reflectivities ( $R_h$ ) of solids and granular materials both in pure form and embedded in a substrate. Also of note is a mid-infrared variable angle spectral ellipsometer (VASE). This instrument, installed in a fume hood approved for studies of NTAs, is used to measure the complex optical constants ( $n + ik$ ) of compounds in the solid and liquid state.

As well as our more fundamental investigations, we have done quantitative challenges of a number of sensor systems, both in condensed and vapor-phase, including handheld dispersive instruments, surface acoustic wave (SAW) sensors, passive standoff detection systems, and Quantum Cascade Laser (QCL) based systems.

Our publications include technical reports available through DTIC and articles in the open literature describing our work on the optical constants of chemical warfare agents/related materials and energetics. One product, the *ECBC Quantitative Infrared Spectral Library* is available on request through the Chemical/Biological/Radiological/Nuclear Information Analysis Center (CBRNIAAC).

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**Optical Spectroscopy Laboratory instrument suite. Capabilities encompass a variety of instruments and accessories in a spectral range from 0.2 to 17  $\mu\text{m}$ .**