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Laser-Induced Breakdown (LIBS) Spectroscopy for Remote Sample Detection

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Rapid, remote detection of dangerous materials is critical for homeland security applications. In many cases, direct contact or irradiation should be avoided because of the potential risks of detonation or contamination of personnel. Laser-induced breakdown spectroscopy (LIBS) systems are commercially available for material detection at near ranges, but these systems do not have hardware for sample collection. Sample collection and preconcentration are typically necessary when working with trace samples (especially low vapor pressure materials).

Sandia National Laboratories has designed and built a preconcentration unit for the collection and transport of a chemical sample into a LIBS system for remote detection. This combined LIBS system has the unique ability to collect a sample from a surface (possibly sample collection from multiple areas) prior to analysis. This system allows for sampling large surface areas in significantly shorter times with an increased probability of detection. Results of the initial study of LIBS analysis with the sampling and preconcentration unit will be presented and discussed.

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