COMPOUNDSEMI ONLINE
COMPOUNDSEMI NEWS

Chemical warfare agent detection systems development update

August 11, 2005...Northwestern University researchers (Illinois, USA) have created a quantum cascade laser that may one day be a part of a man portable (or perhaps even handheld) system to detect chemical warfare agents (CWA's). Portable compound semi-based CWA detectors is a field in which Ahura Corporation of Wilmington, Massachusetts USA already has a established a foothold with their Ramen laser-based handheld devices. Northwestern's development effort is part of a three-year program called Laser Photoacoustic Spectroscopy (LPAS), funded by the Defense Advanced Research Projects Agency (DARPA) to create a system that can warn against a wide variety of potential threats.

The researchers at Northwestern University have created the quantum cascade laser (QCL) that can operate continuously at high power and at room temperature with an emission wavelength of 9.5 microns and light output greater than 100 milliwatts, according to a PhysOrg.com article. The researchers contend that existing standard diode lasers such as those that read CD's or scan barcodes do not operate at the wavelengths required to detect chemical warfare agents (CWA's). While every chemical has a unique 'fingerprint? because it absorbs light at a particular frequency, most CWA's absorb light in the 8 to 12 micron range.

Over the next two years, the Center for Quantum Devices director, Manijeh Razeghi and her team at Northwestern will work to put together a detection system based on the center's far-infrared laser. The system will then be evaluated by DARPA for use by the military. The Center for Quantum Devices at Northwestern, a leader in high-power QCL research. was reportedly the first university research lab in the world to successfully grow, fabricate, and test quantum cascade lasers in 1997. After the initial demonstration of room-temperature pulsed lasers in 1997, the primary efforts of Razeghi and her colleagues over the past several years have been to increase the laser's operating temperature, power output, and efficiency for the continuous operation necessary for sensitive chemical analysis.

The Ahura Corporation's approach focuses on a device with a similar function of detecting chemical warfare agents and other potential threats. Unlike the device the Northwestern University researchers are attempting to design, the handheld Ahura system uses a Raman-laser for spectroscopy. The results are interpreted by a sophisticated algorithm and compared with signatures of known chemical agents including industrial chemicals, explosives, narcotics, and chemical warfare agents. The system, called the First Defender, can be used through glass or plastic. Details on First Defender can be found on the company's website, www.ahuracorp.com. Ahura recently received the Product Innovation Award for Homeland Security Devices for their First Defender product from Frost and Sullivan.