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A Swept Wavelength Optical Resonant Raman Detector (SWOrRD) for Bio-detection. CHARLES MANKA, Research Support Instruments, Lanham, MD, JACOB GRUN, Naval Research Laboratory, Washington, DC, DAN ZABETAKIS, NRL-DC, SERGEI NIKITIN, GELU COMANESCU, RSI, JEFF BOWLES, DAVID GILLIS, NRL-DC — A new device that sequentially illuminates bacteria with different ultraviolet wavelengths and obtains a spectrum at each wavelength has been developed and tested. The available wavelengths are spaced at $\sim$ 0.3 nm intervals from 210 to 280 nm. Tuning from one wavelength to another requires 20 to 60 seconds, depending on the wavelength region. Liquid samples are contained in a quartz cuvette, illuminated side-on and the scattered light is collected at 90 degrees. A double spectrograph and CCD camera record the resulting Raman Spectra. Spectra from the sequential illumination are assembled into a data "cube" for processing and analysis. Measurements of two-dimensional resonant-Raman spectra of bacteria are presented and the applicability of the method for the identification of bacteria, including differentiation of genetically similar species, is demonstrated. We anticipate that information within such two-dimensional spectra will allow identification of bacteria, as well as chemicals, in complex environments containing multiple organisms and chemicals. This device may lead to instruments that rapidly identify bacteria in hospital and food process settings, for screening large populations, and for biochemical-threat warning systems.

Charles Manka
Research Support Instruments

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