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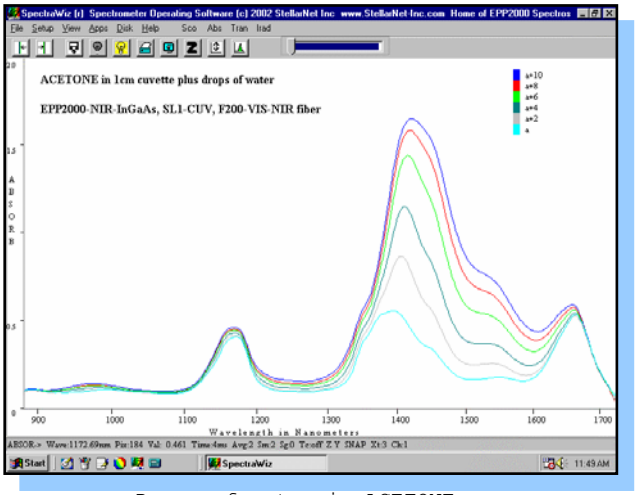
Analytical Instrumentation

Surf the New Wave in Portable Fiber Optic Spectrometry

RED-Wave NIR Spectrometers with 512 or 1024 InGaAs detector arrays

The RED-Wave NIR spectrometers are equipped with high performance InGaAs PDAs to cover the NIR wavelength range from 0.9-2.3 µm. The units are exceptionally robust with no moving parts and are packaged in small rugged metal enclosures (2.75" x 4" x 6") for portable, process, and lab applications. The InGaAs detector is a Sensors Unlimited linear photo diode array with 512 pixels (**1024 optional**) 25µm by 500µm tall to provide maximum sensitivity. The detector has an integrated thermo electric cooler (TEC) maintained at –10 °C, stabilized within +/-0.1 °C. The NIR spectrometers take a single strand SMA 905 terminated fiber optic cable with low OH as input. Several models provide a variety of operational ranges and resolutions suitable for both spectroscopy and optical spectrum analysis.



Drops of water in ACETONE

The units interface to a PC via USB-2 and can be operated simultaneously with StellarNet UV-VIS spectrometers to provide a Dual-Detector Super-Range (Dual-DSR) spectroscopy system. A list of NIR applications include chemical ID of solids and liquids, moisture analysis, SpectroRadiometry and optical power measurements including NIR laser characterization, *microsensor* applications, and multi-layer thin-film measurements.

The SpectraWiz software is included free and enables a variety of spectroscopy applications under every version of Windows including XP/Vista. Additional software is included for user customization via Excel with VBA or LabVIEW at no extra charge.

Specifications	**Zero defect 512 detector RED-Wave-512 NIR Spectrometer $13,125**		
Dynamic range:	4000:1 with 5 decades	Dimensions:	150 x 100 x 68.8 mm
Resolving resolution:	3.1nm with 25µm slit	TEC Power	2 Amps @ 5 VDC
InGaAs Detector:	512 pixel cooled PDA array	Interface:	USB-2
Detector range:	0.9-1.7µm (900-1700nm)	Data transfer speed:	40x faster than USB-1
Pixel size:	25um x 500um	Detector Integration:	1 millisecond to 30 secs
Pixel well depth:	130 x10^8 electrons	Slit size options:	25, 50,100, or 200µm
Selectable well control:	130 x10^8 or 5 x10^6 el.	Operating systems:	Win98/NT/Me/00/XP
Signal to noise:	4000:1 with TEC cooling	Software included:	SpectraWiz program & apps
Digitizer:	16 bit @ 2.5 MHz rate	Also **free** programs for:	LabView,Excel+VBA,Delphi

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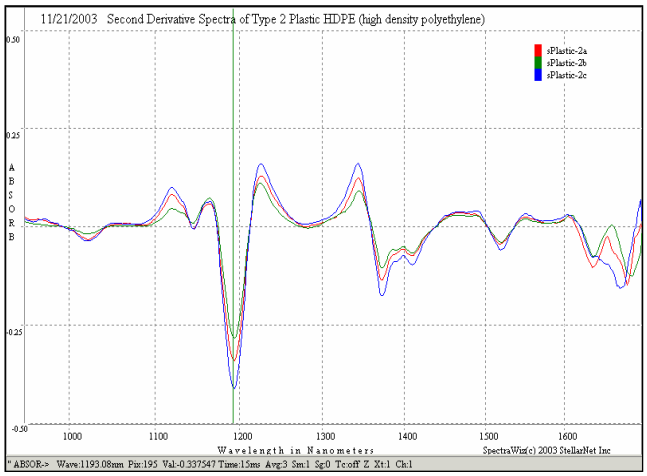
RED-Wave NIR Spectrometers with 512 or 1024 InGaAs detector arrays

The StellarNet RED-Wave fiber optic spectrometers are available in several models to provide optimal ranges and resolutions for various NIR applications in the standard 0.9-1.7µm and extended 1.5-2.2µm ranges. The standard detector is a 512 element photo diode array (PDA) with 25 x 500µm tall pixels and has zero defects. An optional 1024 element InGaAs PDA will double the resolution over the same range, however it can have <1% non-adjacent dropout pixels. The SpectraWiz software driver provides correction for any dropouts.

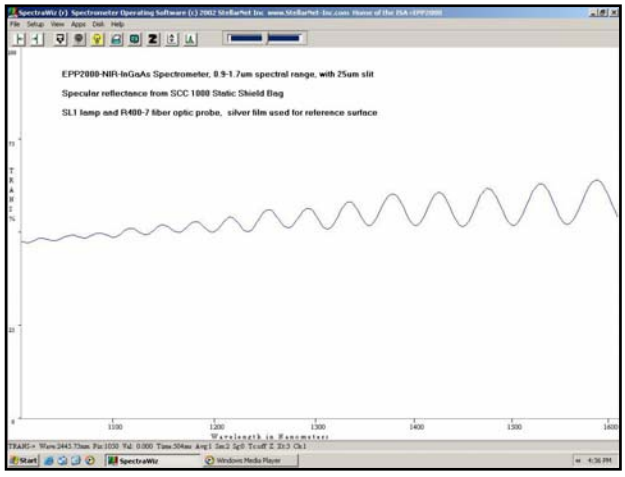
Extended range systems for 1.5-2.2µm are available in 512 or 1024 element InGaAs PDA's with 25 x 250um tall pixels. Because of reduced sensitivity and higher dark noise, the extended range InGaAs spectrometers are primarily used for measuring tunable lasers, characterizing optics, or chemical absorption & transmission thru cuvettes, flow cells, and dip probes.

InGaAs Model	Number of Elements	Spectrometer Range (nm)	Grating (g/mm)	Grating Range (nm)	Dispersion (nm/pixel)	Estimated Resolving Resolution
NIR	512	900-1700	250	800nm	1.562	3.1nm
NIRb	512	900-1600	300	650nm	1.269	2.5nm
NIR2	512	1250-1575	600	325nm	0.634	1.3nm
NIR2b	512	1150-1475	600	325nm	0.634	1.3nm
NIR	1024	1000-1700	600	700nm	0.683	1.4nm
NIR3-HR	512	1530-1605	1200	70nm	0.195	0.4nm
NIR3-HR	1024	1500-1640	1200	140nm	0.195	0.4nm
NIRX	512	1500-2200	300	700nm	1.367	2.8nm
NIRX	1024	1500-2200	600	700nm	0.683	1.4nm
NIRX-SR	512	900-2300	300	1400nm	5.3	<13nm
NIRX-SR	1024	900-2300	600	1400nm	2.7	<7nm

The optical resolution is based on the grating range obtained by the StellarNet spectrograph and a 512 pixel detector to yield the dispersion. A 25µm slit will image onto one 25µm pitch pixel, and possibly 2, therefore our estimate of resolving resolution uses a factor of 2 times the dispersion. Actual resolutions may vary from the estimates shown. Multiply x2 for FWHM.



Spectrum from InGaAs-512 showing 2nd Derivative spectral reflectance of type-2 plastics (range 900-1700nm; 25 µm slit)



Spectrum from InGaAs-1024 showing specular reflectance of silver coating (range 1000-1700nm; 25 µm slit)

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