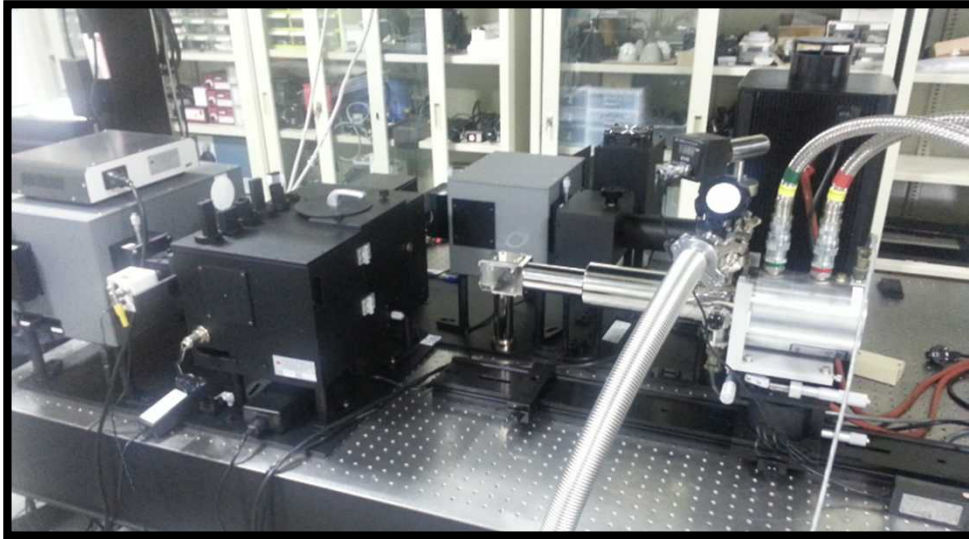


SC-100, Macro PL(E) measurement



Measurement

- Macro Photoluminescence
- Macro Photoluminescence Excitation(Absorption)
- Low Temp Macro Photoluminescence & PLE
- Macro PLE Mapping / Transmittance & Reflectance

Application

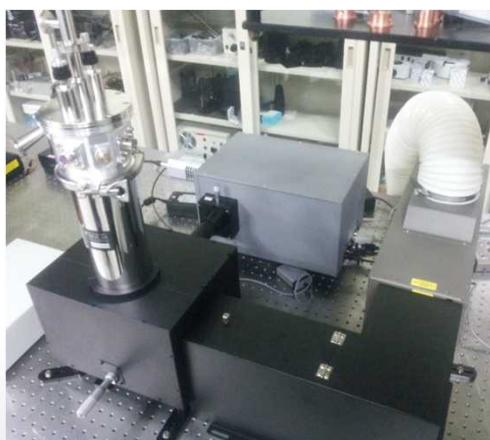
- Semiconductor characterization [(GaN/SiC / (III-V materials)]
- MEMS device characterization
- Sensor development for NIR CCD
- Gemstone PL, Diamond by HPTP, pearl etc
- Material development (LED with GaN/GaAs)
- Deep UV diode laser & PD development[(III-Nitride(AlGaIn))]
- TDPL & Quantum efficiency
- Energy level measurement for Property of absorption & Recombination

Feature

- Compact modular design
- Optional time gated system with 100 ~ 10,000 times signal enhancement
- Compatible with Time Correlated single Photon Counting

Technical specifications

Detecting range	200 – 6,000 nm
System resolution	0.09nm @1200gr/mm grating/ Up to
Spectrometer	Czerny-Turner type, 320 mm focal length(up to 750 mm available on request) Stray light rejection : 10^{-5} Accuracy : +/-0.2 nm Drive step resolution : 0.0025 nm
Detector	R955/R928 PMT detector Optional TE cooled high performance CCD/Photodiode
Laser power control	0.1% ~ 100 % (up to 6 different power level and other level available on request)
Laser excitation	Deep UV ~ NIR (up to 3 different source available)
Lamp source	450W Xe arc lamp mounted vertically in air cooled housing (200 – 1,000 nm) Excitation monochromator : 200 mm focal length , 0.2 nm resol.
Sample chamber	Color & spherical corrected Al mirror for input source, singal XY rotation manual stage to optimize sample position Detachable Cuvett cell holder for Low temp cryostat (optional) Time domain measurement(optional)
Automation(on request)	Software controlled laser rejection filter , order sorting filter and Variable ND filter set to adjust input beam power Step motor scanning turret
Signal to Noise	3000 : 1 or better (water raman spectrum, 350 nm excitation)
Software	Select monochromator, turret and grating Wavelength range, number of point/resolution, integrating time and accumulation function



Low temp(77K LN cooled) Macro PL System with Ar ion laser

System input source(Lasers)

Parameter				
Measurement	PL	PL/Raman	PL/Raman	PL/Raman
Wavelength (nm)	266+/-1	325	532	785
Spectral line width(nm)	-	-	-	<1nm
Output power	100mw	50mw	100mw	120mw
Mode	Near TEM00 Elliptical	TEM00	TEM00	TEM00
Operating mode	Pulsed	CW	CW	CW
Beam dia.(mm)	0.5x2mm	<1.2	<2.0+/-0.2	<0.8
Beam divergence(mrad)	-	<0.5	<1.5+/-0.2	-
Mode Quality(M2)	-	-	<1.2	<1.3
Polarization	-	Linear(>500:1)	Linear(100:1)	Linear(100:1)
Power stability(%)	<10(4hr)	<+/-2.0(4hr)	3 (over2hr)	+/-2
Operating Temp.	10~35C	10~60C	10~35C	15~45C
Life time(Hr)	8,000	2,000	10,000	-
Power supply	90 - 264VAC	100~240V, 50/60Hz	85~240V 50/60Hz	110~220V
Fiber optic Option	Available	Available	Available	Available



DongWoo Optron Co., Ltd.

System input source(Lamp)

Parameter			
Lamp type	Deuterium	Xe arc	QTH
Wavelength range	200 – 350nm	320 – 1100 nm	380 – 2400 nm
Lamp power	30W	450W	250W
Output power @200 mm FL monochromator , 600 gr/mm grating		2. 0 mw/cm ² @480 mm	1.3mw/cm ² @1050 nm
Band pass	9 nm at visible , 10 um slit		
Operating mode	CW	CW	CW
Power stability(%)			
Operating Temp.	10~35C	10~60C	10~35C
Life time(Hr)			100
Fiber optic Option	Available	Available	Available



DML202-QTH250,
250W QTH monochromatic light source

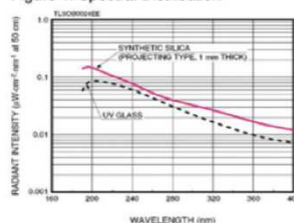


DLA-450-XE,
450W Xe arc lamp set



- 30W Deuterium Bulb for UV

Figure 1: Spectral Distribution

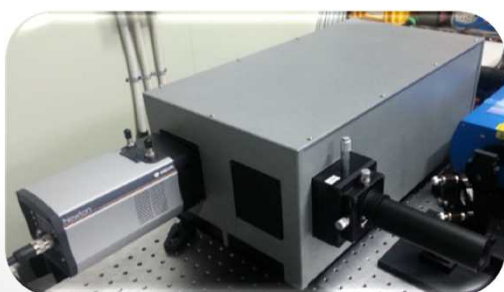


- Spectral response(Deuterium lamp)

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System Monochromator

Parameter	
Application	Spectrum analyzer , monochromatic light source
Focal length	500 mm
Aperture ratio	f/6.5
Optical design	Czerny-Turner, Imaging spectrograph by Toroidal
Optical port	Adjustable side entrance and two exit slits
Mechanical scan range	0~1,200 nm
Operating range	330 nm ~ 2,600 nm
Gratings turret	Triple grating turret controlled by Software With 1200gr/mm 500 nm blz , 1200gr/mm 850 nm blz. 600gr/mm 1600 nm blz gratings
Resolution	0.045 nm
Dispersion	1.7nm/mm
Accuracy	+/-0.1 nm
Repeatability	+/-0.04 nm
Focal plane size	26mm wide x 14mm high
Detector coverage	41nm @ 1200gr/mm grating
Slit	A micrometer controlled adjustable slit assembly for one entrance and two exit ports 0 to 5mm(10micrometer increment/decrement unit)
Interface	RS232 & USB standard
Size/Weight	546(L)X258(W)X224 mm(H)/15Kg



DongWoo Optron Co., Ltd.

System detector

Parameter			
Application	Photoluminescence, Raman, PLE, Reflectance & Transmittance		
Detector type	PMT	IGA(InGaAs)	PBS(PbS)
Spectral range	185~900 nm	800~1,700 nm	1,000~2,800 nm
Sensing Area	24 mm	3 mm dia	3 mm dia
High voltage	0~800 V(Max1200)		
Cooling system	Non cooled	TE Cooled	TE Cooled
Responsivity (V/W @ pk)		$0.9 \times 10^8 / 10^7$	$10^7 / 10^6$
Output signal type	Voltage/Curr ent	Voltage	Voltage
Noise		$5 \times 10^6 / 0.5 \times 10^6 (V/Hz)$	$3 \times 10^5 / 10^6 (V/Hz)$
Operating temperature	50 ~ -30 C	22 ~ -30 C	22 ~ -30 C
Response time	2.2ns(anode pulse rise time)	2 u sec(min.)	
Power requirement	AC110 ~ 220V /1.2 A 50/60Hz	+/-9VDC to +/-15VDC	

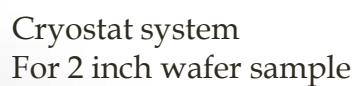


- PDS-1, PMT detector

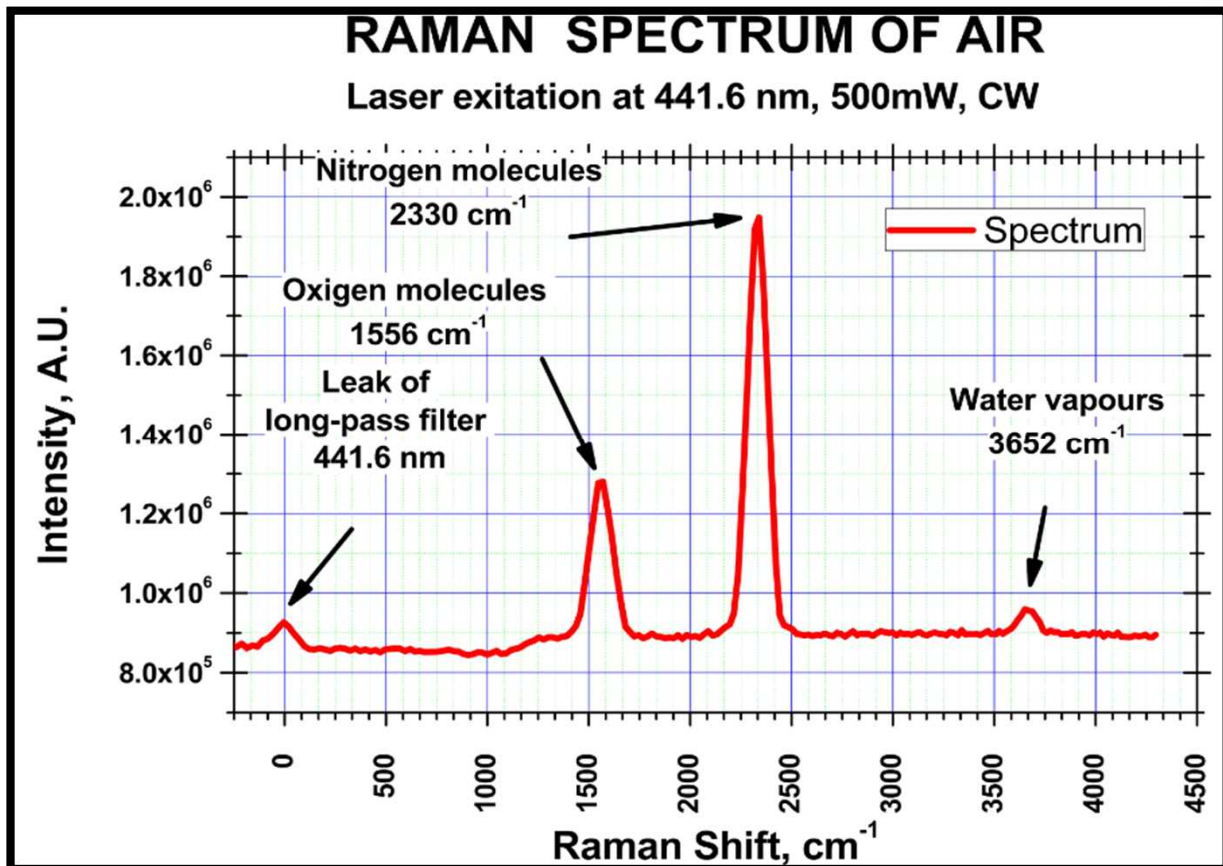


- Photodiode detector

Noise level	60dBA
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System sensitivity



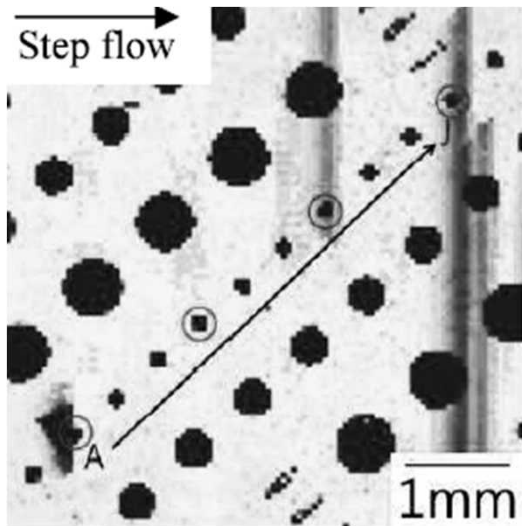
Data for Air Raman with macro sample chamber.

Test condition

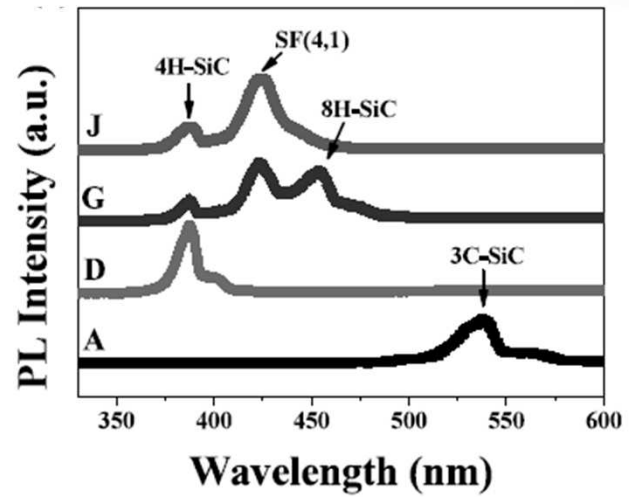
Laser : 532nm 500 mw output , Monochromator :
MonoRa500i (600gv/ 500bz), slit: 1mm

Lens : Planoconvex lens & Detector : PMT(DongWoo)-
Exposure times : 20min.

Sample test (SiC)

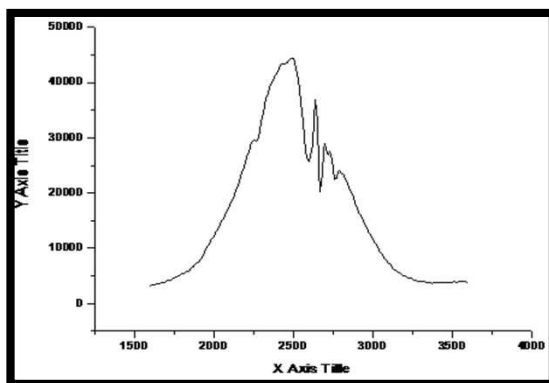


Test 1. PL mapping image

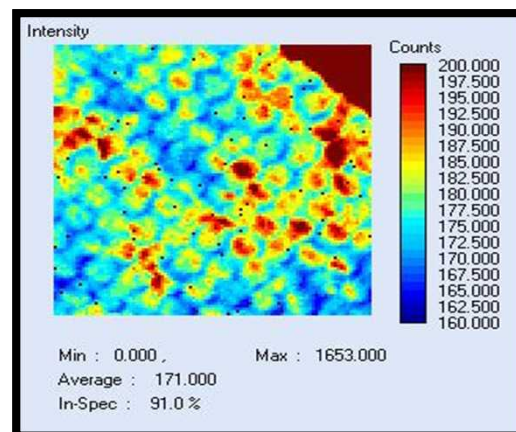


Test 2. PL spectrum

Sample test (PBS & GaN LED)

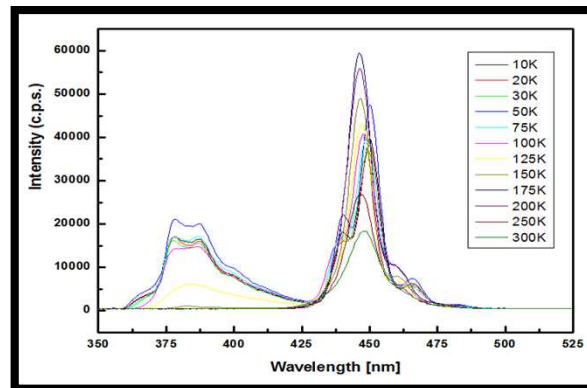
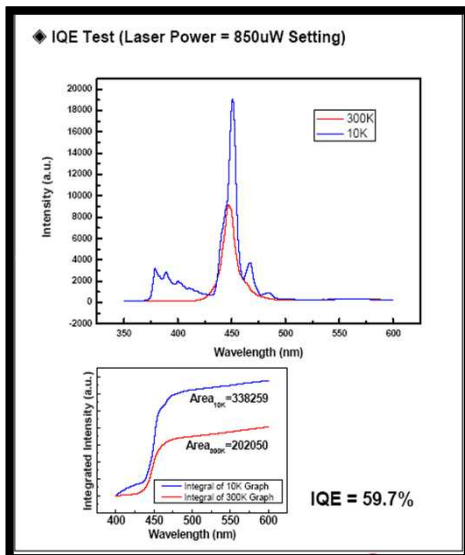


Test 3. PBS Nano rod spectrum



Test 4. GaN LED wafer mapping data

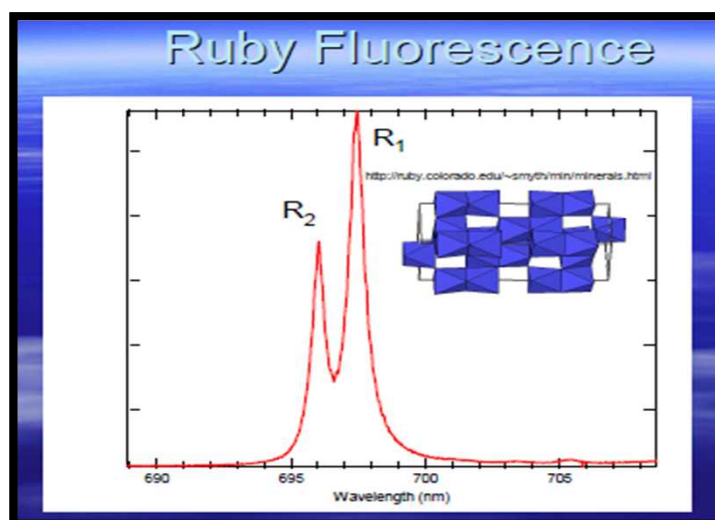
IQE & TDIPL(GaN LED)



Test 5. GaN LED wafer MQW spectrum

Test 6. Temperature-dependent PL : 300K,250K,200K,150K,100K,50K,10K

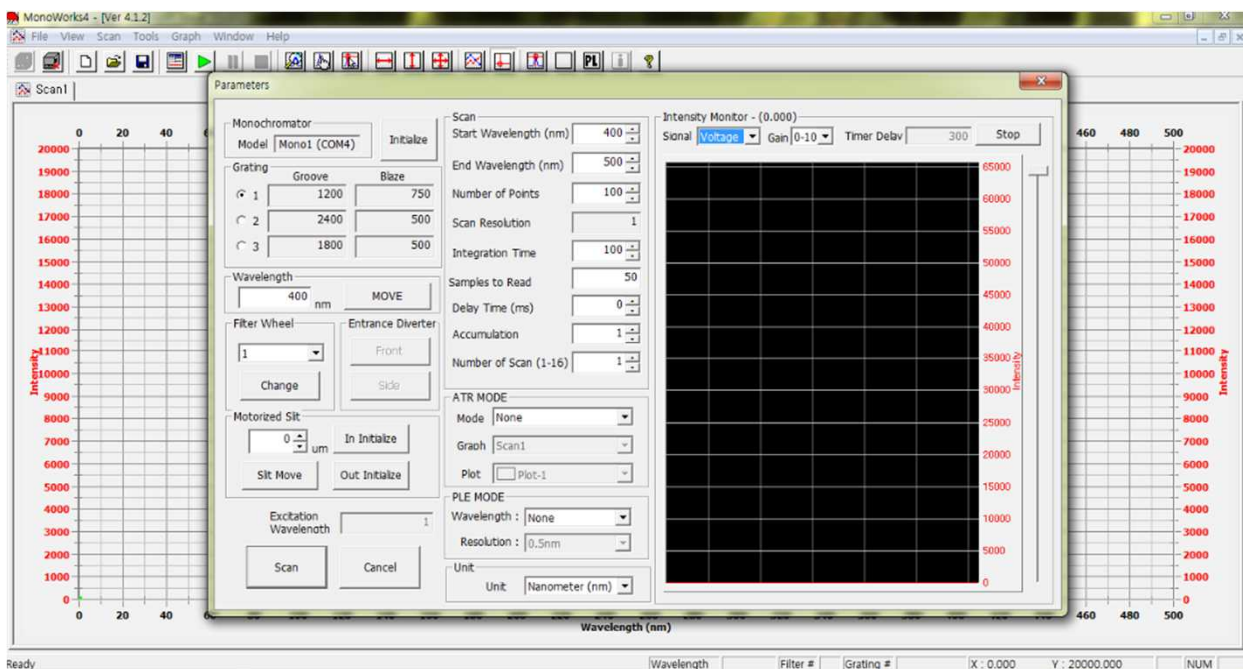
Gemstone



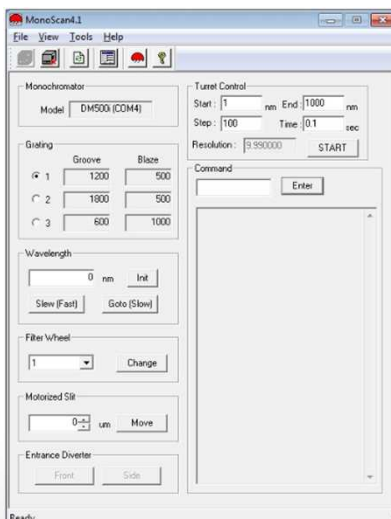
Test 7. Ruby spectrum

Software ; Monoworks operating program

- Single / Double monochromator control(optional) by user selection
- Easy parameter selection & zoom in/out
- Select monochromator, serial port , turret, grating & current wavelength information
- Set the wavelength range of scan
- Set the resolution & integrating time (msec)
- Set the accumulation
- Peak finder
- Unit : Wavelength, eV, cm-1
- Semi-Auto calibration

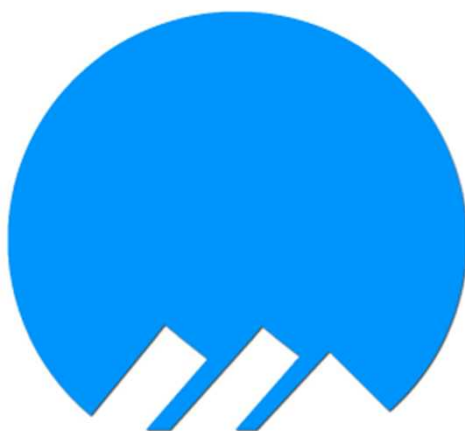


Monoworks 4.3, spectrum writer



Monoscan 4.1
monochromator control
software

- Select wavelength, Model of Monochromator And Grating
- Set the interface(RS232 & USB)
- Control motorized filter wheel And slit module
- Command setting (Accuracy , grating position modulation etc.)



Partner for Spectroscopy

Leading spectroscopy company Since 1989
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