

Specification of MiniSpec

Yu-Yang Lee (RA) and Yu-Ming Chang (PI)

CCMS, NTU

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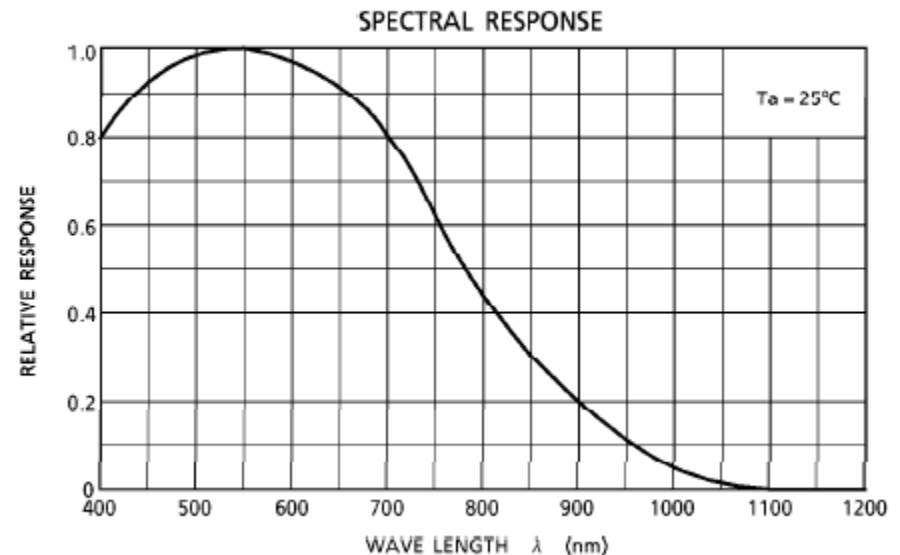
Grating Specification

Newport Plane Rule Grating 10RG300-500-1

Type	Plane Ruled Reflection
Reflector Coating	Aluminum
Dimensions	25 x 25 x 6 mm
Grooves per mm	300
Nominal Wavelength	500 nm
Nominal Blaze Angle	4.3 °
Thickness	6.0 mm
Nominal Blaze Wavelength Tolerance	±25 nm (1st order, Littrow, typical)
Clear Aperture	24 x 24 mm

Mightex Line-CCD Specification

Parameter	Specification
CCD	Toshiba TCD1304DG
Number of Pixels	3648
Pixel Size	8 μ m $\times$ 200 μ m
Spectral range	TCE-1304-U : 350nm to 1000nm
Pixel Output Clock	0.5 MHz
Data Storage on camera	4 Frames
ADC resolution	16 bits
External Trigger	Yes
Exposure Time Range	0.1ms – 6,500ms
GPIO	Yes (4 programmable I/O's)
Frame Rate	138 scans/second*
Host Interface	USB 2.0



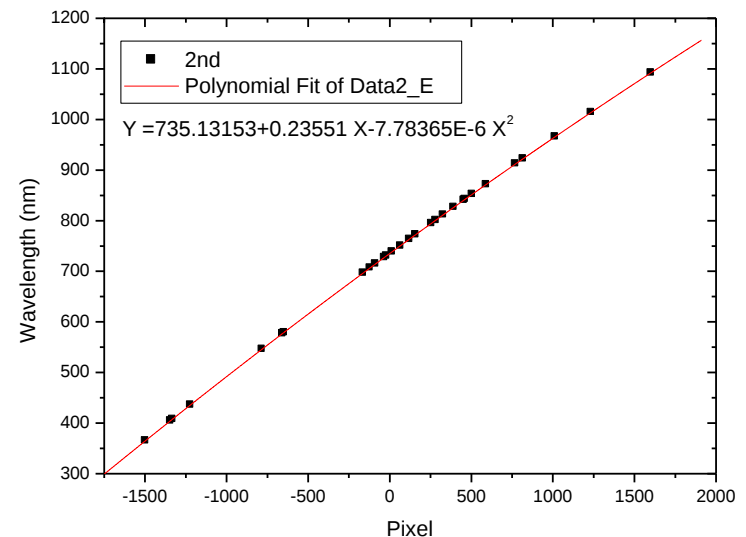
Specification and Calibration of Mightex CCD Spectrometer

- Spectrometer Specification

1. Visible region: 280-1140nm
2. Spectrum line width of CAL-2000: $1.18 \pm 0.15 \text{ nm}$
3. Accuracy: $\sim 0.156 \text{ nm}$

- Calibration Procedure

1. Input CAL-2000 calibration light source
2. Compare the spectrum with the one in the last page.
3. Record peak locations in relative pixel (pixel number subtracted by 1824)
4. Fit the data points with 2nd order curve



Statically Analysis of Spectral Accuracy

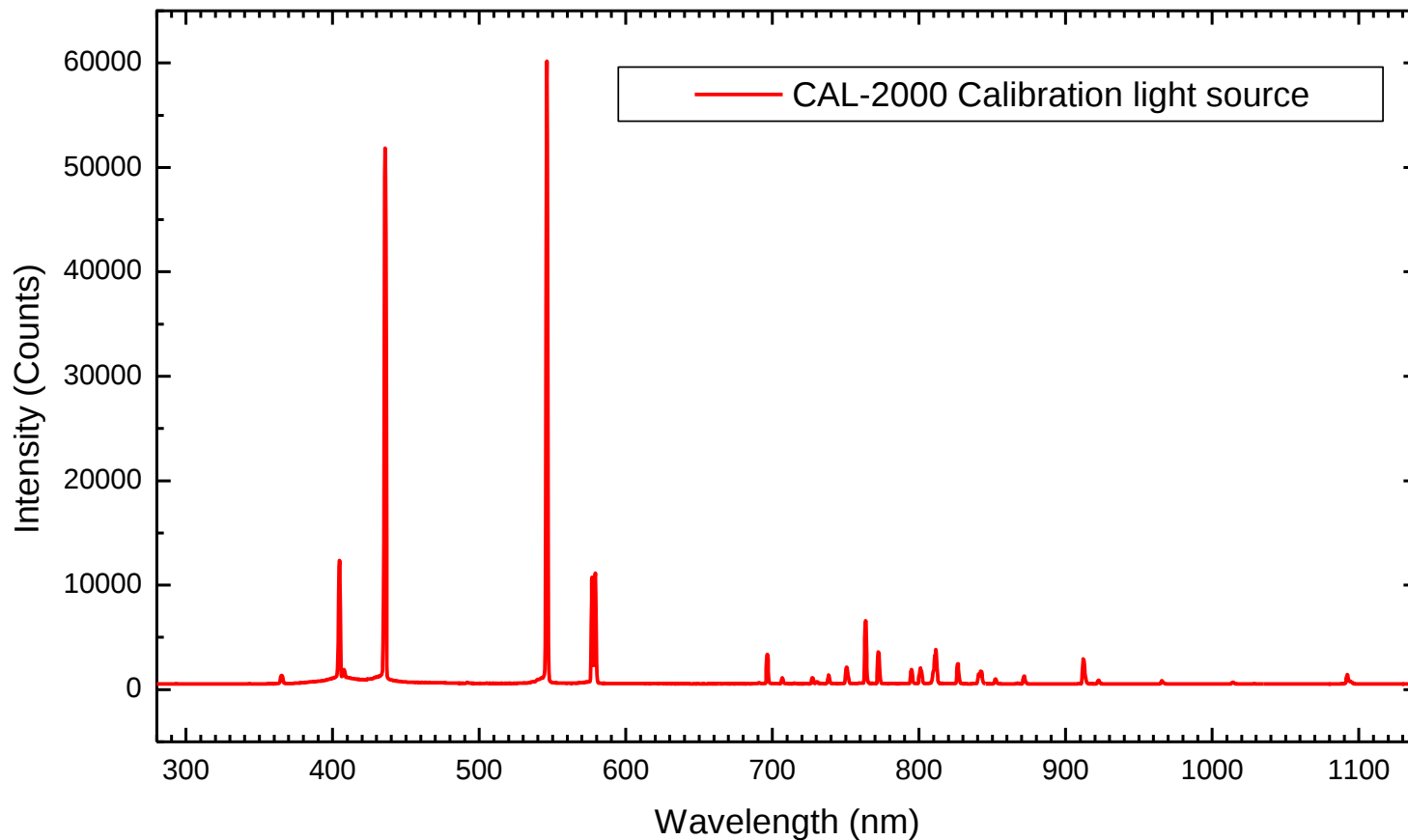
- Accuracy of Spectrometer

Theoretical Peak Location (nm)	Reading Peak Location (nm)	Difference (nm)	Theoretical Peak Location (nm)	Reading Peak Location (nm)	Difference (nm)
365.01	365.130	-0.120	772.42	772.148	0.272
404.66	404.546	0.114	794.82	794.912	-0.092
407.78	407.622	0.158	800.62	800.926	-0.306
435.83	435.715	0.115	811.53	811.541	-0.011
546.06	546.203	-0.143	826.45	826.485	-0.035
576.96	577.042	-0.082	840.82	840.677	0.143
579.07	579.253	-0.183	842.46	842.047	0.413
696.54	696.537	0.003	852.14	852.079	0.061
706.72	706.758	-0.038	871.68	871.599	0.081
714.7	714.583	0.117	912.3	912.083	0.217
727.29	727.351	-0.061	922.54	922.570	-0.030
730.3	730.418	-0.118	965.78	965.716	0.064
738.4	738.427	-0.027	1013.975	1014.115	-0.140
750.39	750.641	-0.251	1092.12	1092.232	-0.112
763.51	763.514	-0.004	Standard Deviation (nm)		0.156

Statically Analysis of Spectral Linewidth

Peak Location (nm)	Linewidth (nm)
365.01	1.58
404.66	1.16
407.78	1.21
435.83	1.12
546.06	1.06
576.96	1
579.07	1
696.54	1.08
706.72	1.14
738.4	1.13
763.51	1.1
772.42	1.2
794.82	1.23
826.45	1.27
922.54	1.38
Averaged Linewidth(nm)	1.18±0.15

Spectrum of CAL-2000 Detected by MiniSpec



Peaks Location (nm)	
365.01	772.42
404.66	794.82
407.78	800.62
435.83	811.53
546.06	826.45
576.96	840.82
579.07	842.46
696.54	852.14
706.72	871.68
714.7	912.3
727.29	922.54
730.3	965.78
738.4	1013.975
750.39	1092.12
763.51	