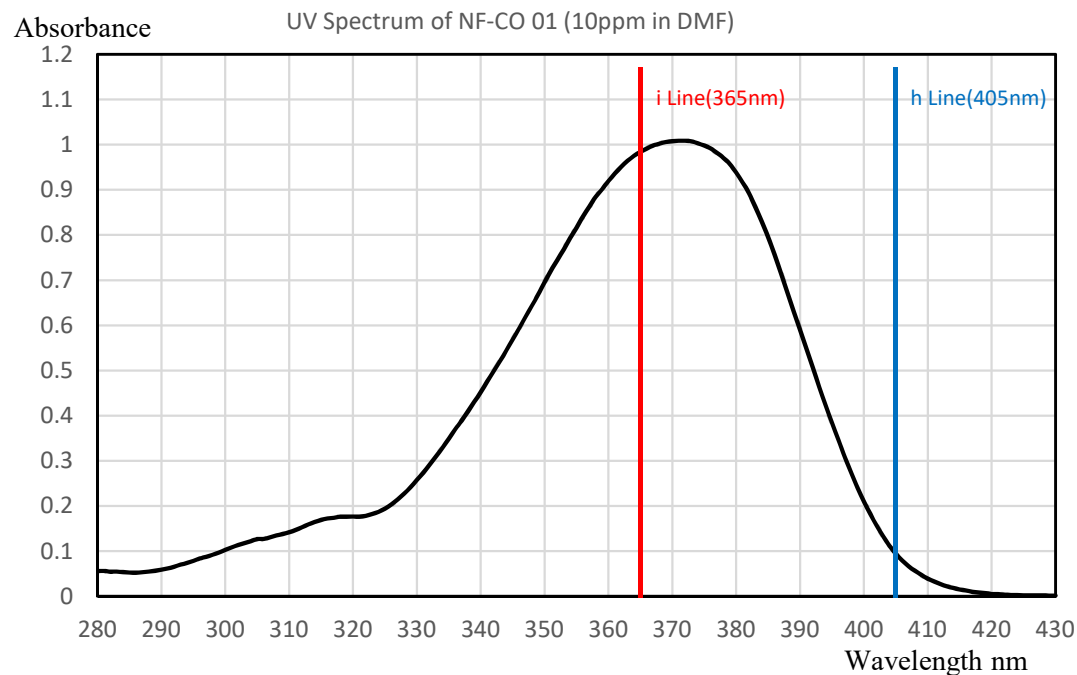


NF Series Sensitizers

NIPPON CHEMICAL WORKS CO., LTD.

株式会社日本化学工業所

NF-CO 01 (Commercial Scale) NIPPON CHEMICAL WORKS CO.,LTD.



[Product Data]

Structure : Coumarin Type

Appearance : Pale Yellow Powder

Melting Point : 69-71°C

Decomposition Point : 276.7°C

Absorption Property (10ppm in DMF)

$\lambda_{\max}$: 371.0nm

Fluorescence Property (0.8ppm in DMF)

Ex : 370.0nm

Em : 433.0nm

Intensity : 41

Absorption Data(10ppm in DMF)

Wavelength(nm)	$\lambda_{\max}(371.0)$	355	365	385	395	405	436
Absorbance	1.010	0.816	0.816	0.796	0.384	0.095	0
Molar absorptivity [M ⁻¹ · cm ⁻¹]	23793	18889	22778	18426	8889	2199	0

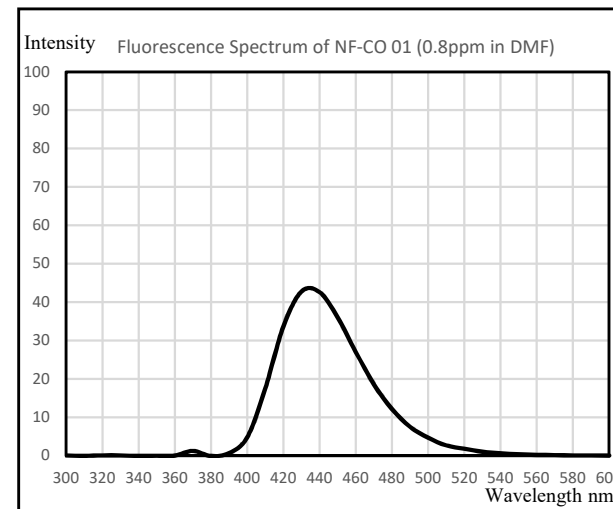
Solubility Data(at 20°C)

Solvent	PGMEA	MEK	Toluene	MeOH
Solubility (g/100ml)	38.1	79	84.9	41.3

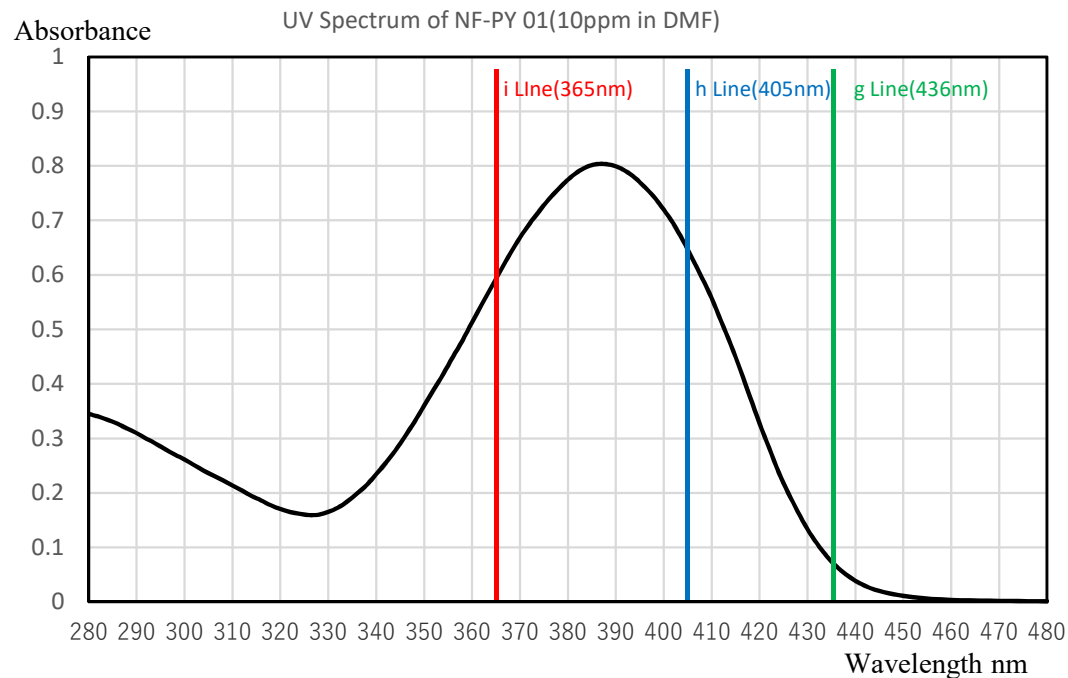
Inventory of Chemical Substances

Country	JAPAN	CHINA	KOREA	TAIWAN	U.S.A	Europe
Contents	○	○	○	○	○	-

Fluorescence Spectrum Data (0.8ppm in DMF)



NF-PY 01 (Commercial Scale) NIPPON CHEMICAL WORKS CO.,LTD.



[Product Data]

Structure : Pyrazoline Type

Appearance : Yellow Powder

Melting Point : 188-192°C

Decomposition Point : 318.3°C

Absorption Property (10ppm in DMF)

$\lambda_{\max}$: 387.0nm

Fluorescence Property (0.8ppm in DMF)

Ex : 386.0nm

Em : 476.0nm

Intensity : 18

Absorption Data(10ppm in DMF)

Wavelength(nm)	$\lambda_{\max}(387.0)$	355	365	385	395	405	436
Absorbance	0.802	0.430	0.589	0.799	0.766	0.644	0.059
Molar absorptivity [M ⁻¹ · cm ⁻¹]	34967	18777	25720	34890	33450	28112	2576

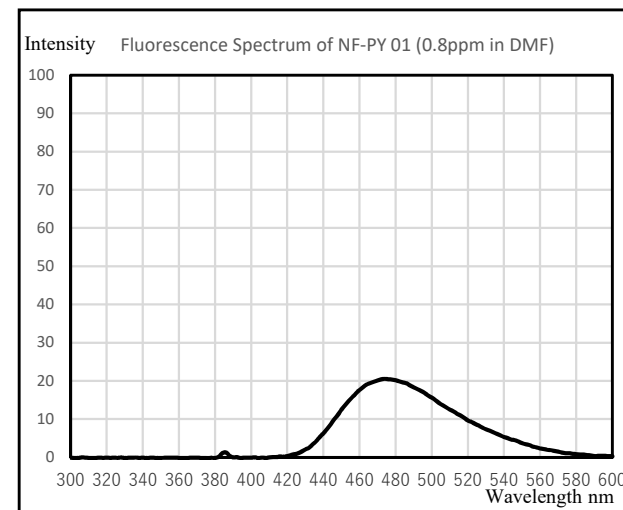
Solubility Data(at 20°C)

Solvent	PGMEA	MEK	Toluene	MeOH
Solubility (g/100ml)	-	1.3	4.8	0.006

Inventory of Chemical Substances

Country	JAPAN	CHINA	KOREA	TAIWAN	U.S.A	Europe
Contents	○	○	-	○	-	-

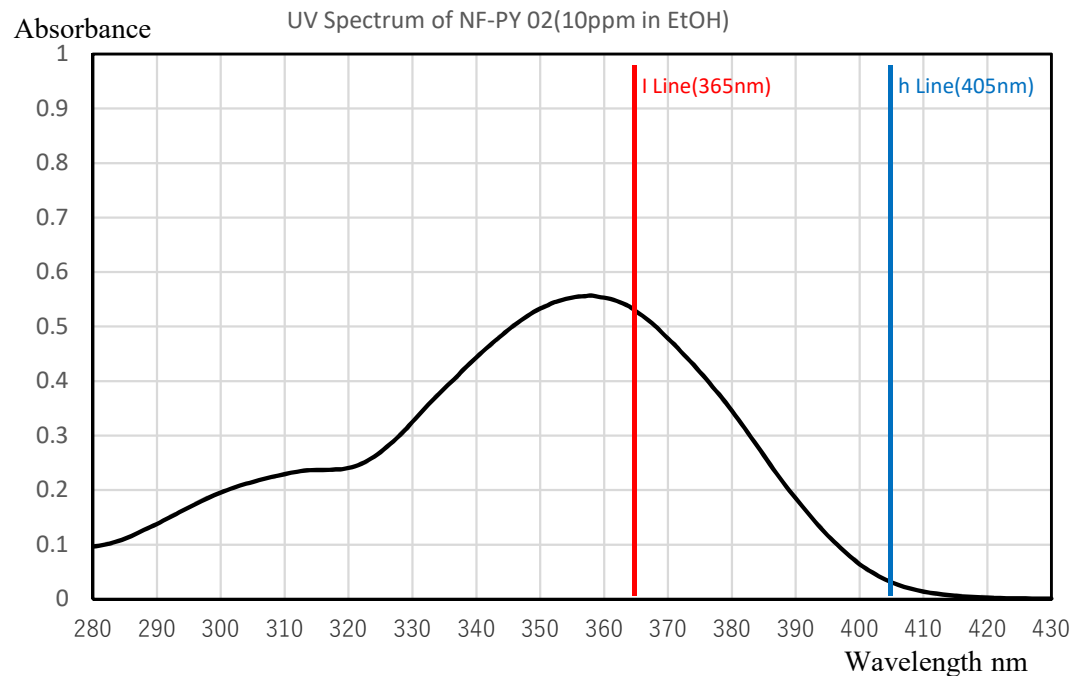
Fluorescence Spectrum Data (0.8ppm in DMF)



NF-PY 02 (Commercial Scale)



NIPPON CHEMICAL WORKS CO.,LTD.



[Product Data]

Structure : Pyrazoline Type

Appearance : Pale Yellow Powder

Melting Point : 150-153°C

Decomposition Point : 293.8°C

Absorption Property (10ppm in EtOH)

$\lambda_{\max}$: 357.7nm

Fluorescence Property (0.8ppm in DMF)

Ex : 360.0nm

Em : 437.0nm

Intensity : 15

Absorption Data(10ppm in EtOH)

Wavelength(nm)	$\lambda_{\max}(357.7)$	355	365	385	395	405	436
Absorbance	0.556	0.553	0.528	0.264	0.117	0.031	0
Molar absorptivity [M ⁻¹ · cm ⁻¹]	19588	19610	18723	9362	4149	1099	0

Solubility Data(at 20°C)

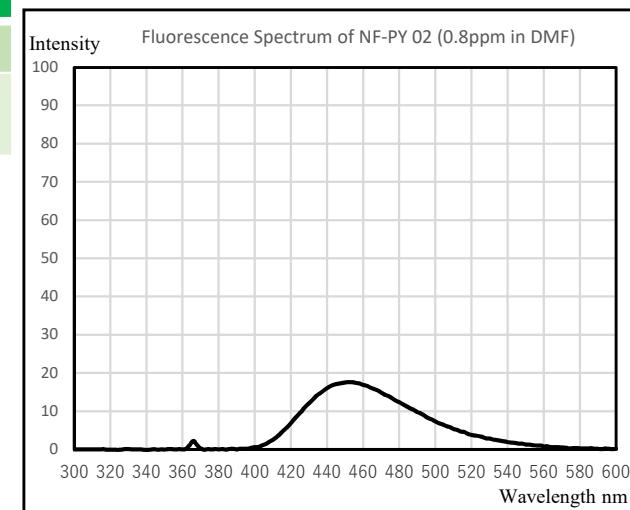
Solvent	PGMEA	MEK	Toluene	MeOH
Solubility (g/100ml)	-	9.3	14.3	< 0.01

Inventory of Chemical Substances

Country	JAPAN	CHINA	KOREA	TAIWAN	U.S.A	Europe
Contents	*1	○	-	○	-	-

*1 : Registered as a small production volume new chemical substance (1t > /year)

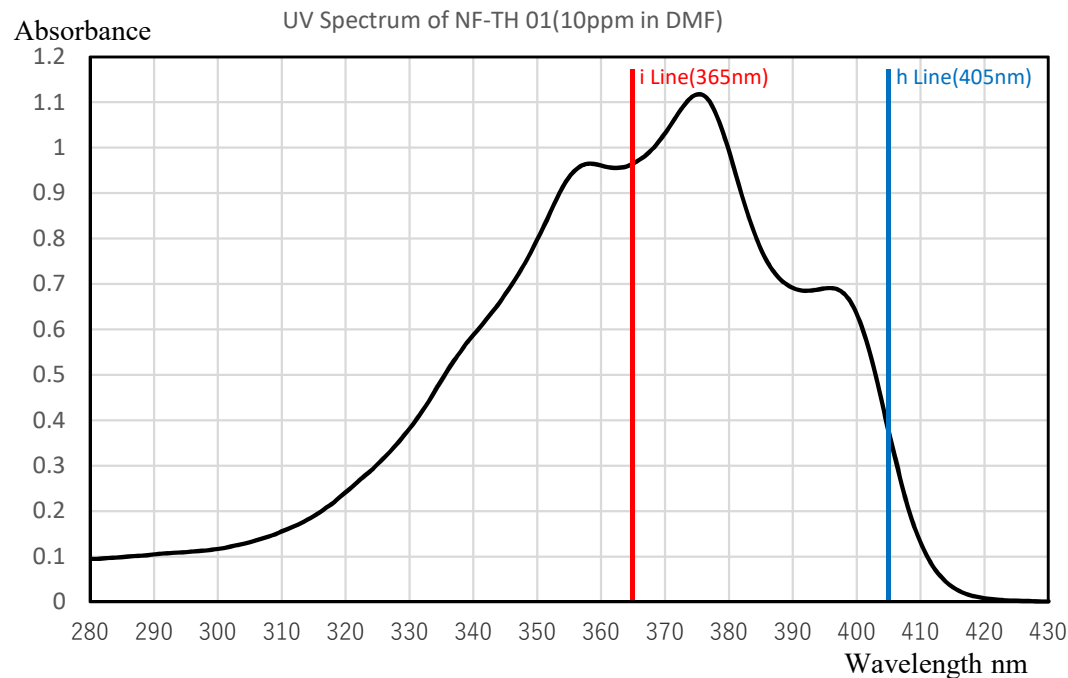
Fluorescence Spectrum Data (0.8ppm in DMF)



NF-TH 01 (Commercial Scale)



NIPPON CHEMICAL WORKS CO.,LTD.



Absorption Data(10ppm in DMF)

Wavelength(nm)	$\lambda_{\max}$ (375.0)	355	365	385	395	405	436
Absorbance	1.117	0.936	0.965	0.777	0.690	0.375	0
Molar absorptivity [M ⁻¹ · cm ⁻¹]	48147	40474	41595	33491	29741	10164	0

Solubility Data(at 20°C)

Solvent	PGMEA	MEK	Toluene	MeOH
Solubility (g/100ml)	0.61	1.0	5.0	0.01

Inventory of Chemical Substances

Country	JAPAN	CHINA	KOREA	TAIWAN	U.S.A	Europe
Contents	○	○	○	○	○	-

[Product Data]

Structure : Oxazole Type

Appearance : Yellowish White Powder

Melting Point : 197-202°C

Decomposition Point : 343.5°C

Absorption Property (10ppm in DMF)

$\lambda_{\max}$: 375.0nm

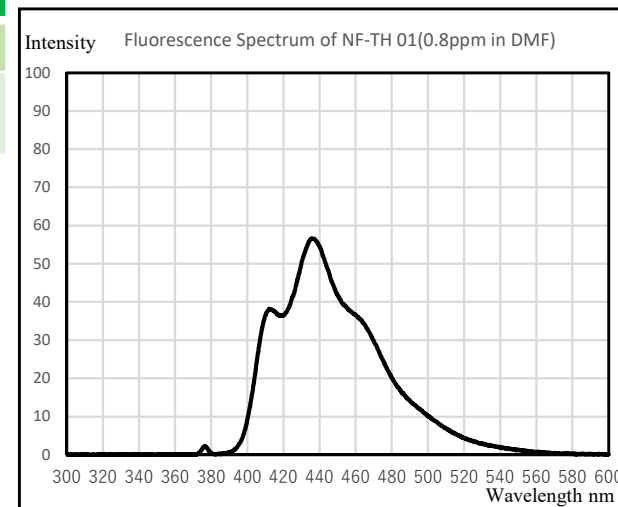
Fluorescence Property (0.8ppm in DMF)

Ex : 375.0nm

Em : 436.0nm

Intensity : 56

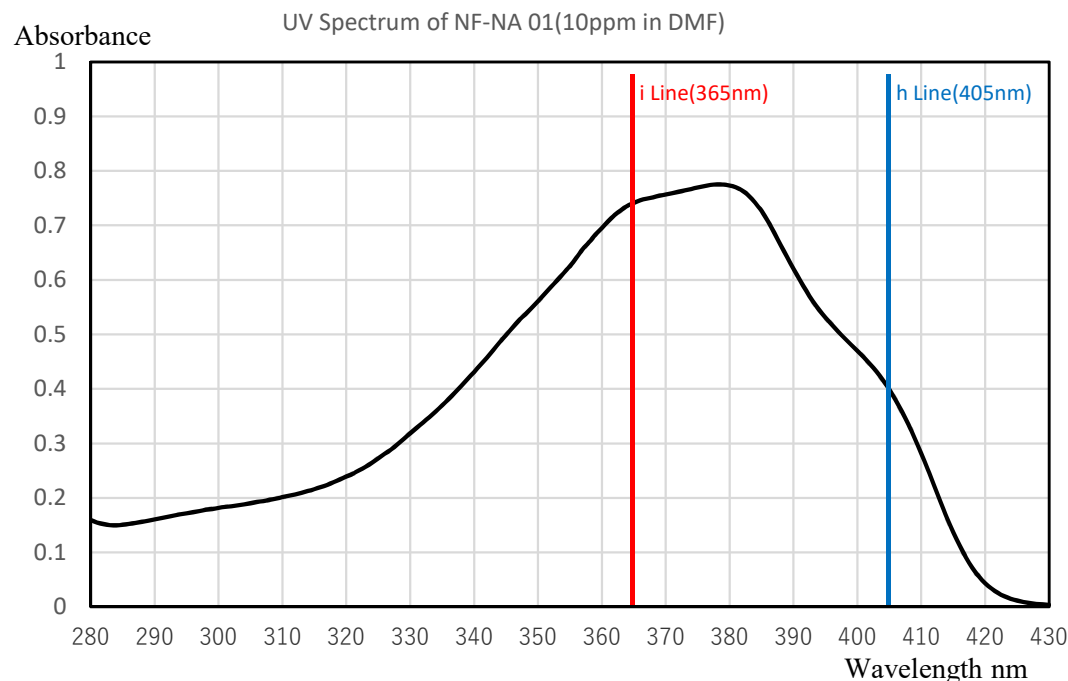
Fluorescence Spectrum Data(0.8ppm in DMF)



NF-NA 01 (Commercial Scale)



NIPPON CHEMICAL WORKS CO.,LTD.



[Product Data]

Structure : Oxazole Type

Appearance : Pale Green Powder

Melting Point : 167°C

Decomposition Point : 412.9°C

Absorption Property (10ppm in DMF)

λmax : 379.0nm

Fluorescence Property (0.8ppm in DMF)

Ex : 379.0nm

Em : 444.0nm

Intensity : 73

Absorption Data(10ppm in DMF)

Wavelength(nm)	λmax(379.0)	355	365	385	395	405	436
Absorbance	0.775	0.625	0.741	0.726	0.531	0.399	0
Molar absorptivity [M ⁻¹ · cm ⁻¹]	36904	29762	35286	34571	25286	19000	0

Solubility Data(at 20°C)

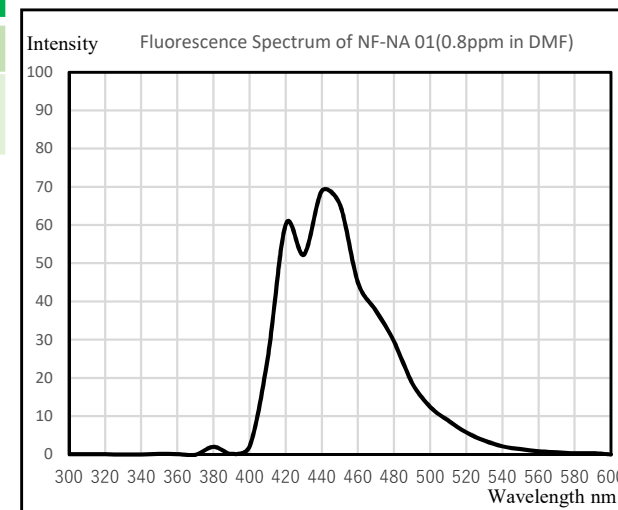
Solvent	PGMEA	MEK	Toluene	MeOH
Solubility (g/100ml)	0.77	2.3	13.1	0.002

Inventory of Chemical Substances

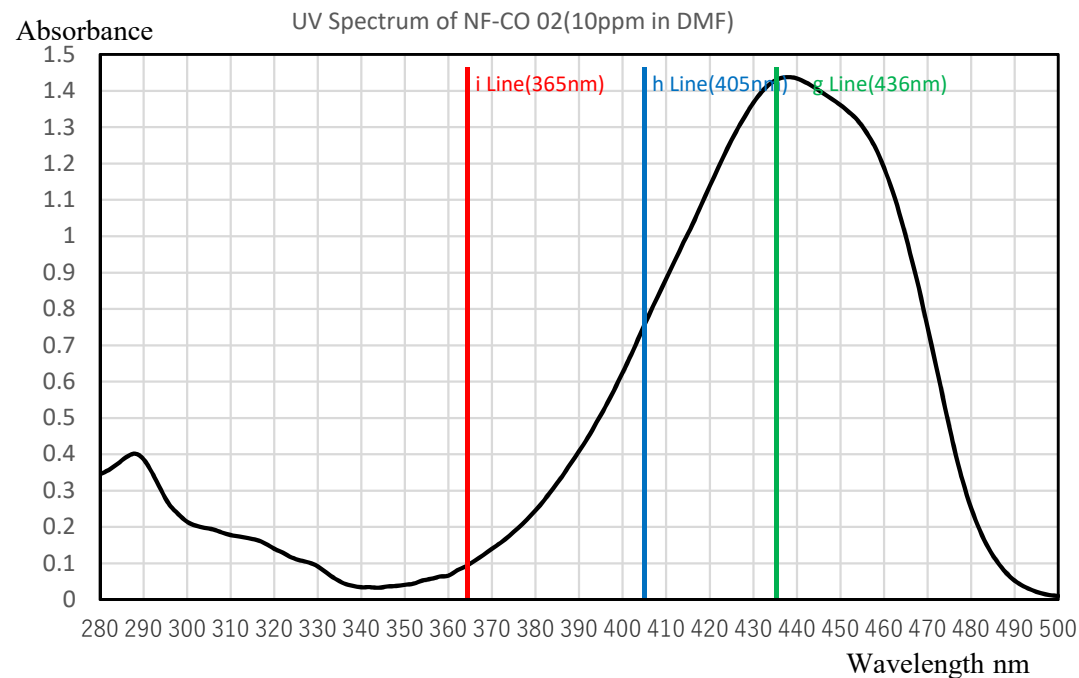
Country	JAPAN	CHINA	KOREA	TAIWAN	U.S.A	Europe
Contents	*1	○	-	○	-	-

*1 : Registered as a small production volume new chemical substance (1t > /year)

Fluorescence Spectrum Data(0.8ppm in DMF)



NF-CO 02 (Lab Scale)



Absorption Data(10ppm in DMF)

Wavelength(nm)	$\lambda_{\max}(438.0)$	355	365	385	395	405	436
Absorbance	1.439	0.061	0.108	0.334	0.523	0.773	1.434
Molar absorptivity [$M^{-1} \cdot cm^{-1}$]	47919	2040	3612	11171	17492	25853	47960

Solubility Data(at 20°C)

Solvent	PGMEA	MEK	Toluene	MeOH
Solubility (g/100ml)	-	0.35	0.09	-

Inventory of Chemical Substances

Country	JAPAN	CHINA	KOREA	TAIWAN	U.S.A	Europe
Contents	○	-	-	○	○	-

[Product Data]

Structure : Coumarin Type

Appearance : Yellow Powder

Melting Point : 230-234°C

Decomposition Point : 339°C

Absorption Property (10ppm in DMF)

$\lambda_{\max}$: 438nm

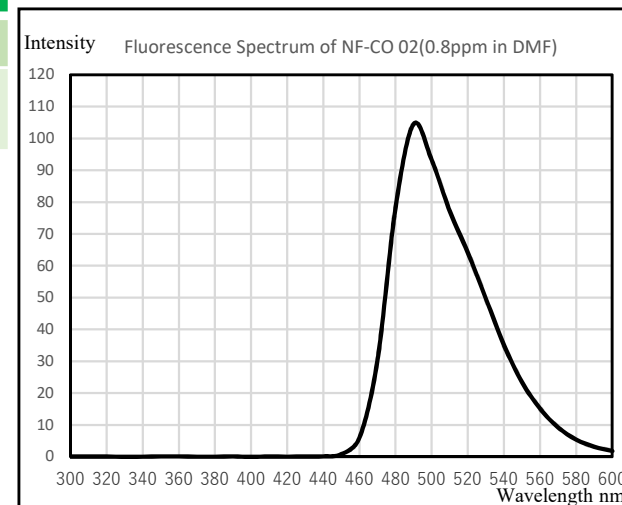
Fluorescence Property (0.8ppm in DMF)

Ex : 453.0nm

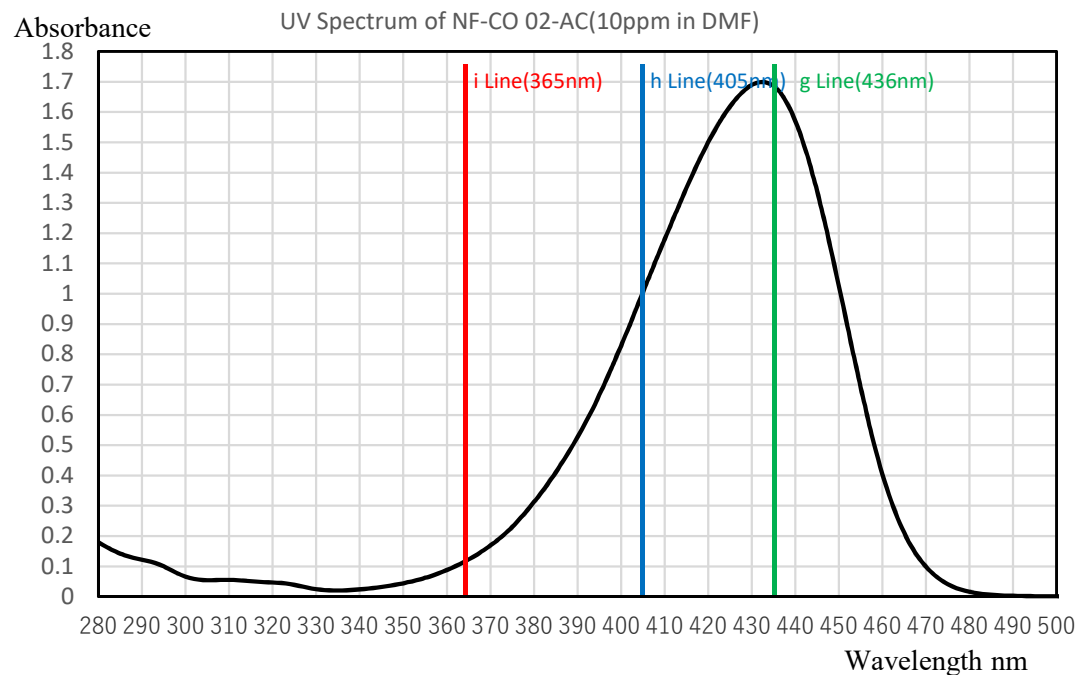
Fm : 491.0nm

Intensity : 105

Fluorescence Spectrum Data(0.8ppm in DMF)



NF-CO 02-AC (Lab Scale)



[Product Data]

Structure : Coumarin Type

Appearance : Reddish Yellow Powder

Melting Point : 152-159°C

Decomposition Point : 269.7°C

Absorption Property (10ppm in DMF)

$\lambda_{\max}$: 432.5nm

Fluorescence Property (0.8ppm in DMF)

Ex : 430.0nm

Em : 477nm

Intensity : 6.3

Absorption Data(10ppm in DMF)

Wavelength(nm)	$\lambda_{\max}(432.5)$	355	365	385	395	405	436
Absorbance	1.696	0.062	0.123	0.410	0.666	1.004	1.674
Molar absorptivity [M ⁻¹ · cm ⁻¹]	43972	1610	3195	10649	17299	26078	43308

Solubility Data(at 20°C)

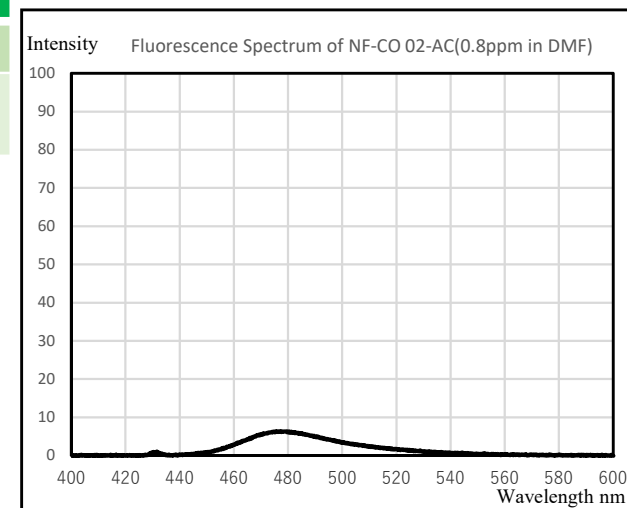
Solvent	PGMEA	MEK	Toluene	MeOH
Solubility (g/100ml)	< 1.0	2.0	-	-

Inventory of Chemical Substances

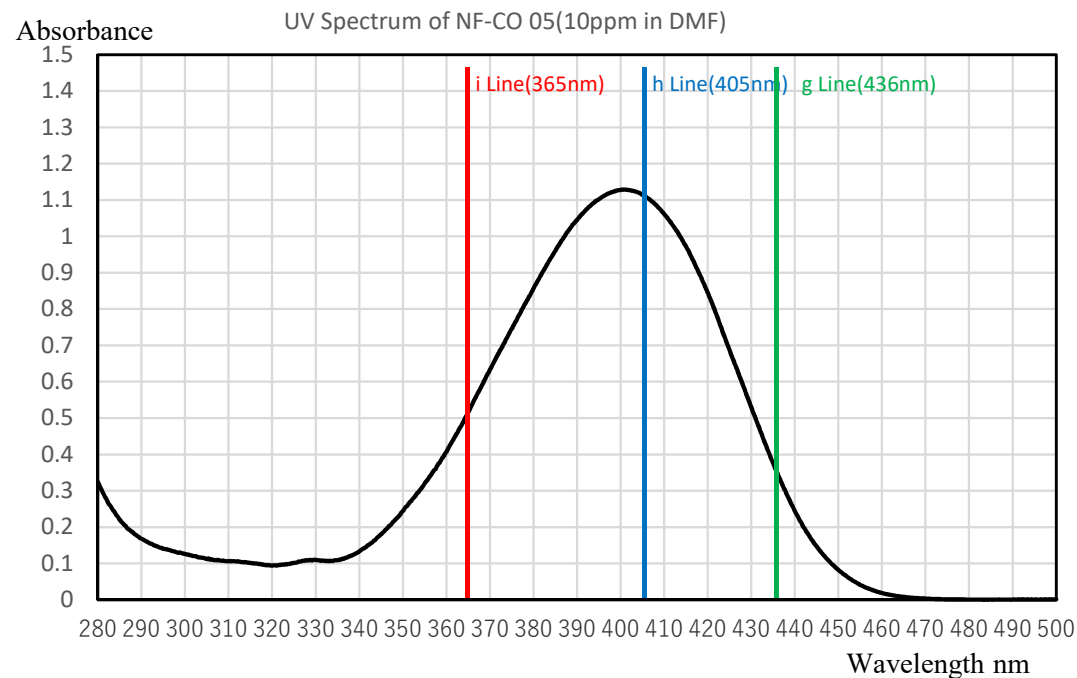
Country	JAPAN	CHINA	KOREA	TAIWAN	U.S.A	Eupore
Contents	*1	-	-	-	○	-

*1 : Registered as a small production volume new chemical substance (1t > /year)

Fluorescence Spectrum Data(0.8ppm in DMF)



NF-CO 05 (Lab Scale)



Absorption Data(10ppm in DMF)

Wavelength(nm)	$\lambda_{\max}(401.0)$	355	365	385	395	405	436
Absorbance	1.129	0.320	0.516	0.960	1.102	1.115	0.348
Molar absorptivity [M ⁻¹ · cm ⁻¹]	42000	12030	19398	36090	41429	41786	13083

Solubility Data(at 20°C)

Solvent	PGMEA	MEK	Toluene	MeOH
Solubility (g/100ml)	-	5.5 $\leq$	-	-

Inventory of Chemical Substances

Country	JAPAN	CHINA	KOREA	TAIWAN	U.S.A	Europe
Contents	-	-	-	-	-	-

[Product Data]

Structure : Coumarin Type

Appearance : Yellow Powder

Melting Point : 190°C

Decomposition Point : 363°C

Absorption Property (10ppm in DMF)

$\lambda_{\max}$: 401.0nm

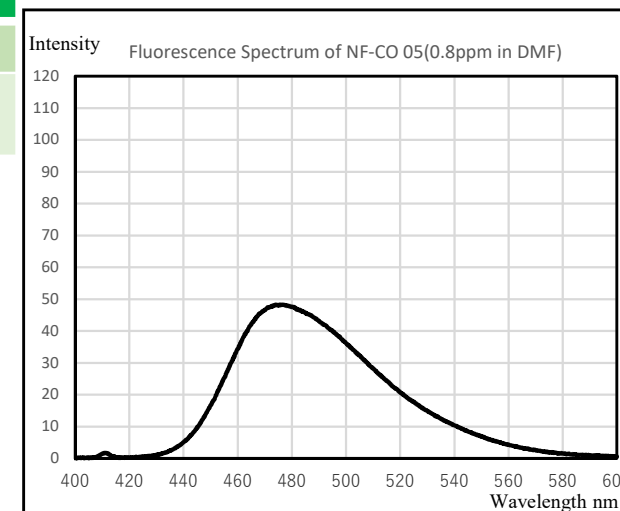
Fluorescence Property (0.8ppm in DMF)

Ex : 410.0nm

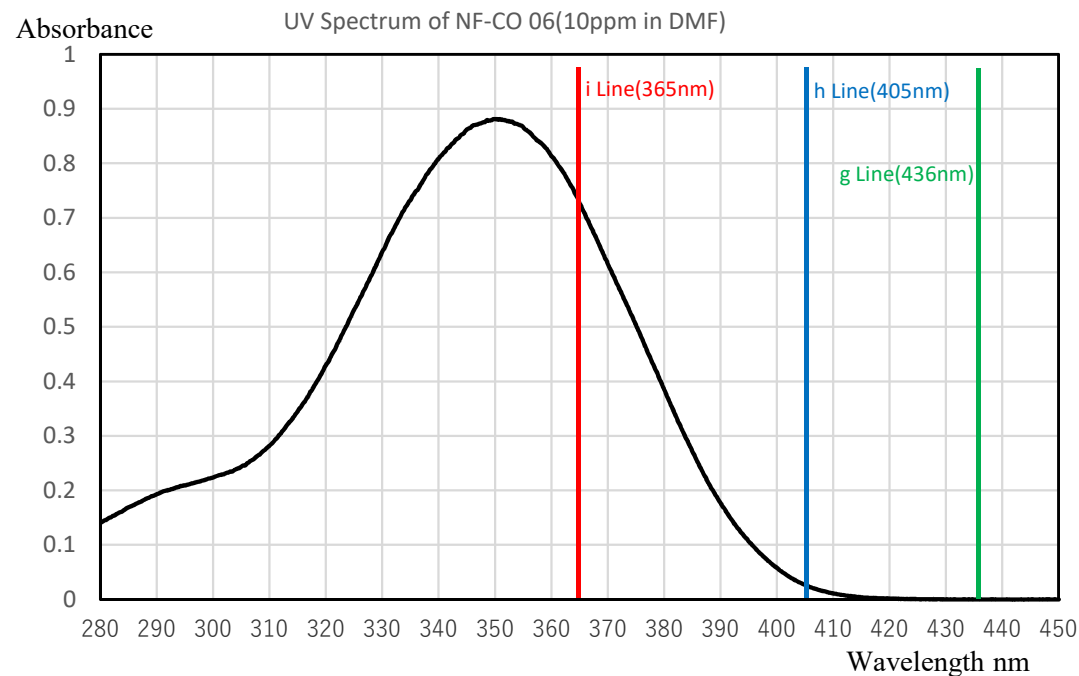
Em : 476.4nm

Intensity : 48

Fluorescence Spectrum Data(0.8ppm in DMF)



NF-CO 06 (Lab Scale)



Absorption Data(10ppm in DMF)

Wavelength(nm)	$\lambda_{\max}$ (349.8)	355	365	385	395	405	436
Absorbance	0.881	0.867	0.727	0.272	0.106	0.026	0
Molar absorptivity [M ⁻¹ · cm ⁻¹]	29000	28997	24314	9097	3545	870	0

Solubility Data(at 20°C)

Solvent	PGMEA	MEK	Toluene	MeOH
Solubility (g/100ml)	-	1.5 $\leq$	-	-

Inventory of Chemical Substances

Country	JAPAN	CHINA	KOREA	TAIWAN	U.S.A	Europe
Contents	-	-	-	-	-	-

[Product Data]

Structure : Coumarin Type

Appearance : Yellow Powder

Melting Point : 223°C

Decomposition Point : 339°C

Absorption Property (10ppm in DMF)

$\lambda_{\max}$: 349.8nm

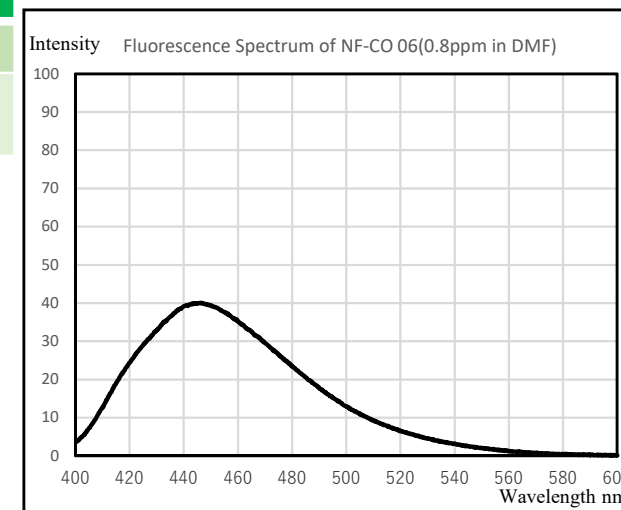
Fluorescence Property (0.8ppm in DMF)

Ex : 352.0nm

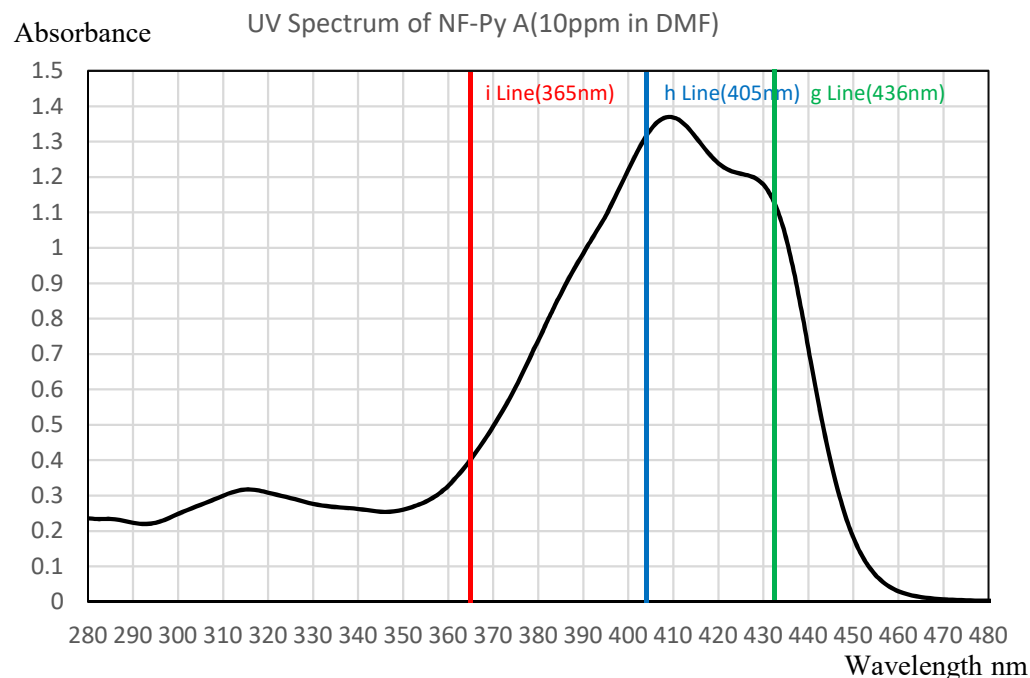
Em : 446.0nm

Intensity : 40

Fluorescence Spectrum Data(0.8ppm in DMF)



NF-Py A (Lab Scale)



Absorption Data(10ppm in DMF)

Wavelength(nm)	$\lambda_{\max}(409.0)$	355	365	385	395	405	436
Absorbance	1.37	0.28	0.40	0.87	1.09	1.33	0.98
Molar absorptivity [M ⁻¹ · cm ⁻¹]	70637	14437	20624	44857	56200	68575	50529

Solubility Data(at 20°C)

Solvent	PGMEA	MEK	Toluene	MeOH
Solubility (g/100ml)	0.4	0.5	0.9	< 0.1

Inventory of Chemical Substances

Country	JAPAN	CHINA	KOREA	TAIWAN	U.S.A	Europe
Contents	-	-	-	-	-	-

[Product Data]

Structure : Pyrazoline Type

Appearance : Yellow Powder

Melting Point : 191-193°C

Decomposition Point : 377.3°C

Absorption Property (10ppm in DMF)

$\lambda_{\max}$: 409.0nm

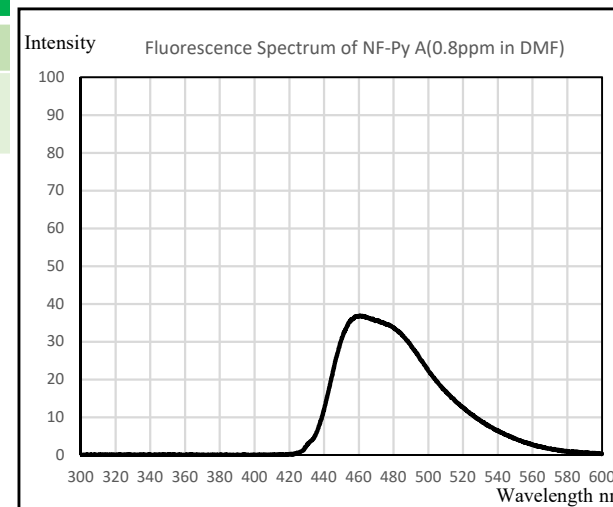
Fluorescence Property (0.8ppm in DMF)

Ex : 430.0nm

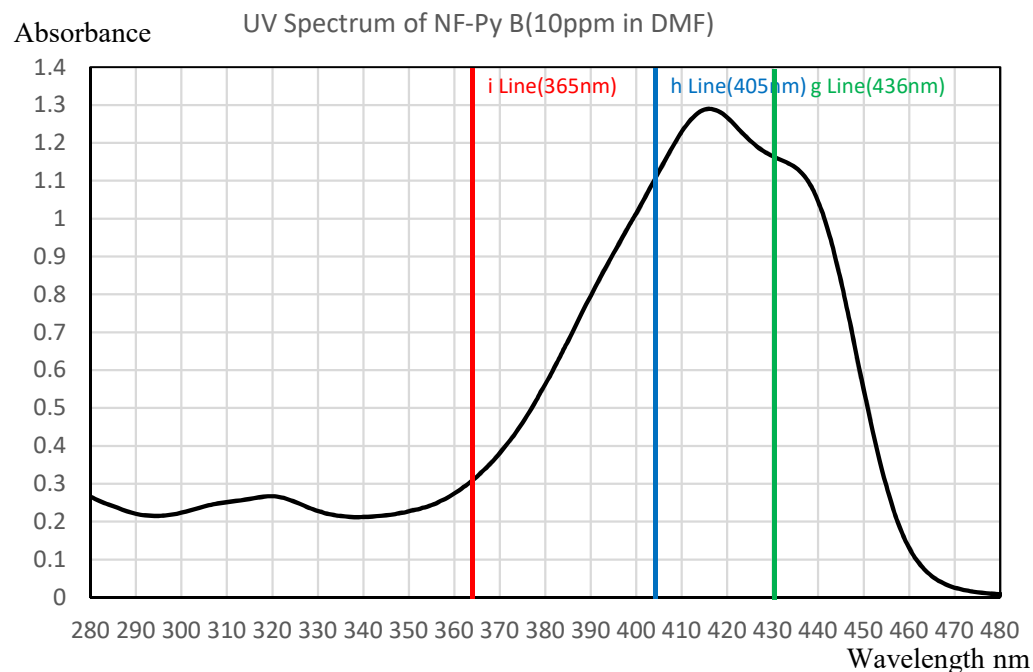
Em : 460.6nm

Intensity : 37

Fluorescence Spectrum Data(0.8ppm in DMF)



NF-Py B (Lab Scale)



Absorption Data(10ppm in DMF)

Wavelength(nm)	$\lambda_{\max}(416.0)$	355	365	385	395	405	436
Absorbance	1.29	0.24	0.32	0.68	0.91	1.13	1.13
Molar absorptivity [$M^{-1} \cdot cm^{-1}$]	68589	12761	17014	36256	48385	60082	60082

Solubility Data(at 20°C)

Solvent	PGMEA	MEK	Toluene	MeOH
Solubility (g/100ml)	< 0.1	0.2	0.2	< 0.1

Inventory of Chemical Substances

Country	JAPAN	CHINA	KOREA	TAIWAN	U.S.A	Europe
Contents	-	-	-	-	-	-

[Product Data]

Structure : Pyrazoline Type

Appearance : Yellow Powder

Melting Point : 198-200°C

Decomposition Point : 361.2°C

Absorption Property (10ppm in DMF)

$\lambda_{\max}$: 416.0nm

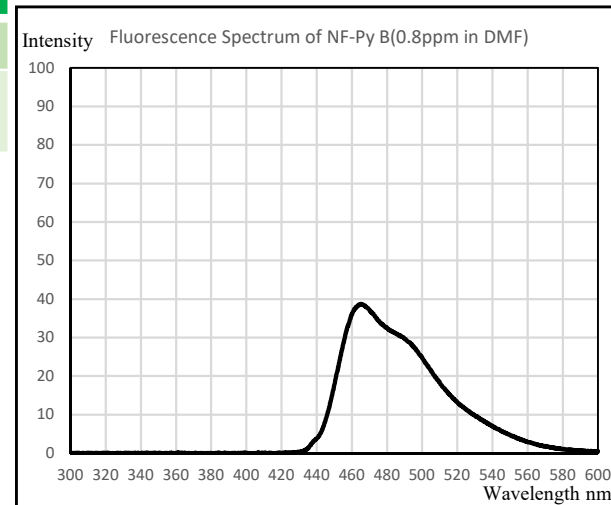
Fluorescence Property (0.8ppm in DMF)

Ex : 437.0nm

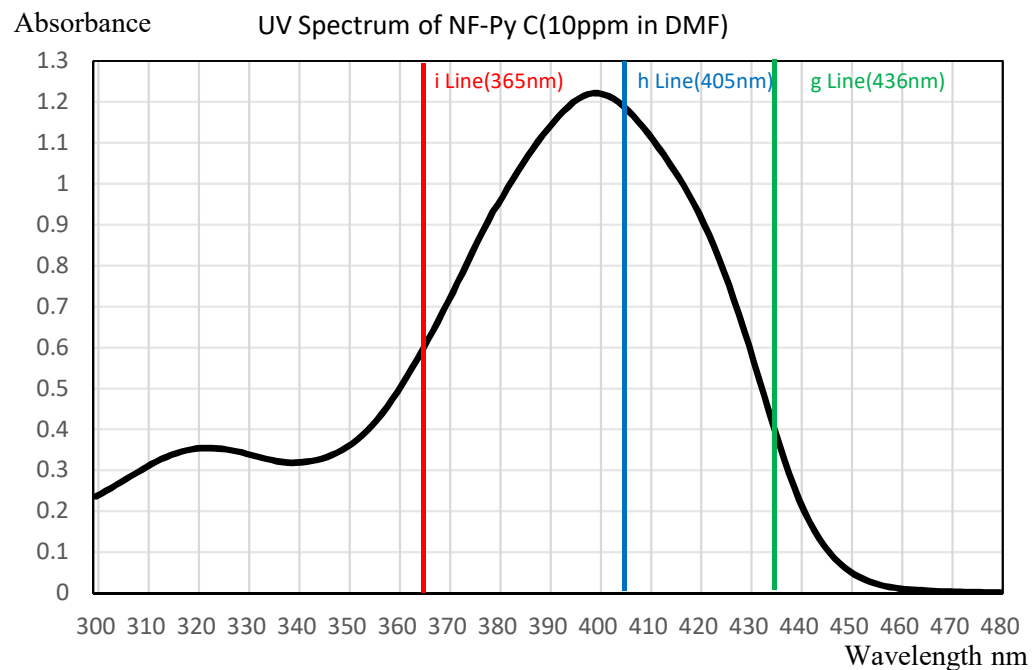
Em : 465.2nm

Intensity : 39

Fluorescence Spectrum Data(0.8ppm in DMF)



NF-Py C (Lab Scale)



Absorption Data(10ppm in DMF)

Wavelength(nm)	$\lambda_{max}(399.5)$	365	395	400	405	410	436
Absorbance	1.222	0.594	1.200	1.222	1.190	1.121	0.365
Molar absorptivity [M ⁻¹ · cm ⁻¹]	50165	24403	49250	50149	48835	46023	14969

Solubility Data(at 20°C)

Solvent	PGMEA	MEK	Toluene	MeOH
Solubility (g/100ml)	0.4	1.0	1.4	< 0.1

Inventory of Chemical Substances

Country	JAPAN	CHINA	KOREA	TAIWAN	U.S.A	Europe
Contents	-	-	-	-	-	-

[Product Data]

Structure : Pyrazoline Type

Appearance : Yellow Powder

Melting Point : 195-197°C

Decomposition Point : 348.9°C

Absorption Property (10ppm in DMF)

λ_{max} : 399.5nm

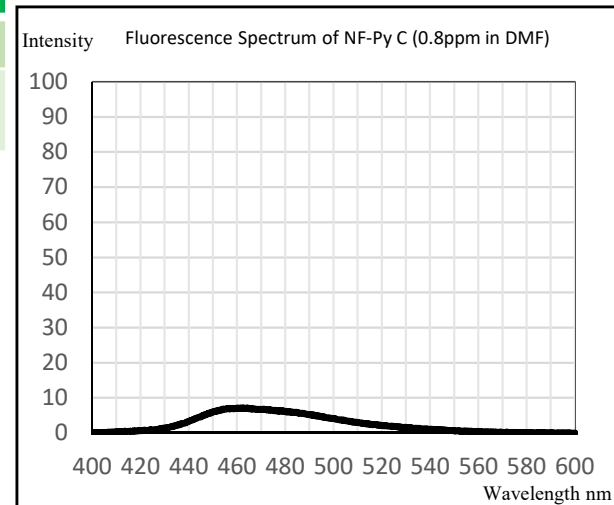
Fluorescence Property (0.8ppm in DMF)

Ex : 384.8nm

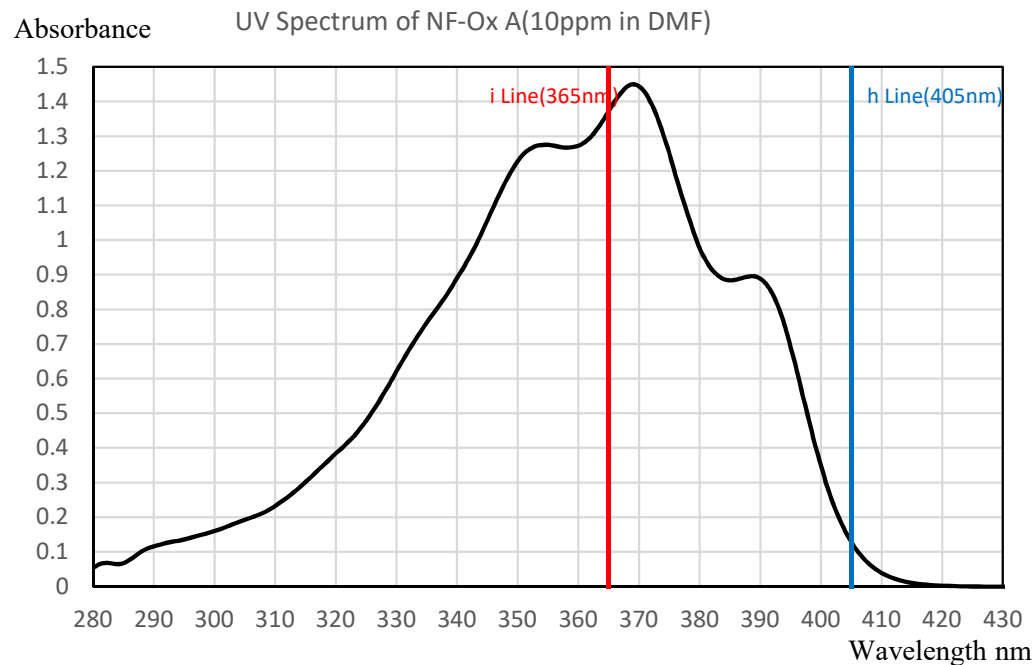
Em : 462.8nm

Intensity : 7

Fluorescence Spectrum Data(0.8ppm in DMF)



NF-Ox A (Lab Scale)



Absorption Data(10ppm in DMF)

Wavelength(nm)	$\lambda_{\max}$ (369.0)	355	365	385	395	405	436
Absorbance	1.45	1.28	1.37	0.88	0.69	0.13	0
Molar absorptivity [M ⁻¹ · cm ⁻¹]	65333	57673	61728	39650	31089	5857	0

Solubility Data(at 20°C)

Solvent	PGMEA	MEK	Toluene	MeOH
Solubility (g/100ml)	< 0.1	< 0.1	0.7	< 0.1

Inventory of Chemical Substances

Country	JAPAN	CHINA	KOREA	TAIWAN	U.S.A	Europe
Contents	-	-	-	-	-	-

[Product Data]

Structure : Oxazole Type

Appearance : Pale Yellow Powder

Melting Point : 259-261°C

Decomposition Point : 360°C

Absorption Property (10ppm in DMF)

$\lambda_{\max}$: 369.0nm

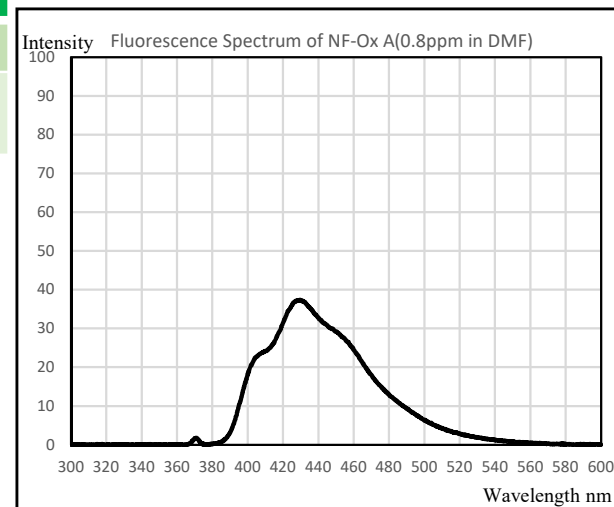
Fluorescence Property (0.8ppm in DMF)

Ex : 369.0nm

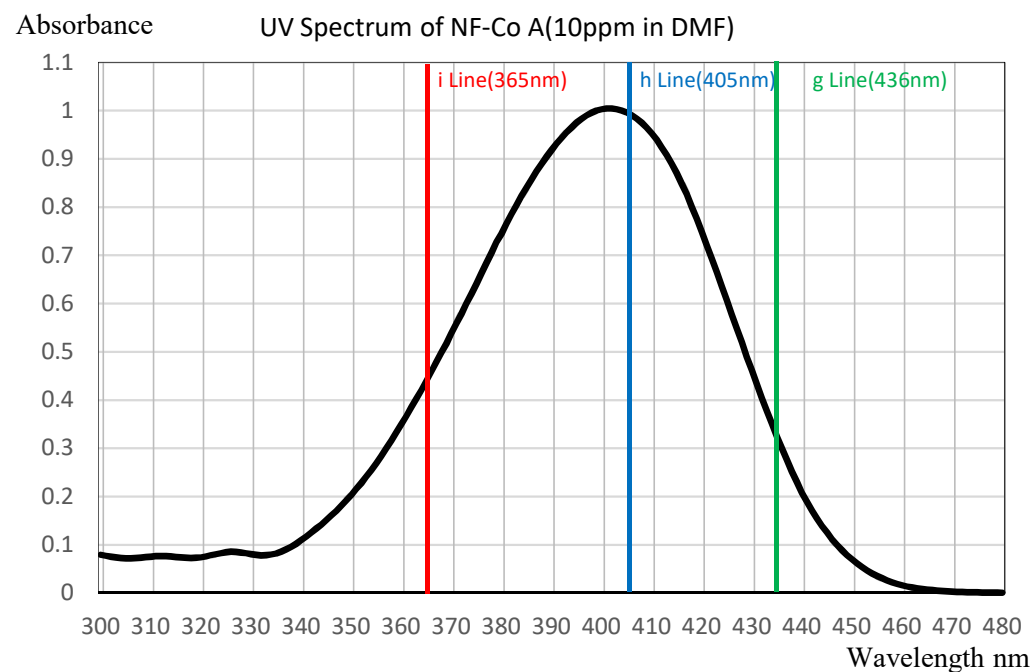
Em : 429.6nm

Intensity : 37

Fluorescence Spectrum Data(0.8ppm in DMF)



NF-Co A (Lab Scale)



Absorption Data(10ppm in DMF)

Wavelength(nm)	$\lambda_{\max}(401.5)$	365	395	400	405	410	436
Absorbance	1.005	0.440	0.975	1.003	0.996	0.953	0.299
Molar absorptivity [M ⁻¹ · cm ⁻¹]	35312	15455	34272	35242	35010	33495	10521

Solubility Data(at 20°C)

Solvent	PGMEA	MEK	Toluene	MeOH
Solubility (g/100ml)	1.3	3.5	1.2	0.2

Inventory of Chemical Substances

Country	JAPAN	CHINA	KOREA	TAIWAN	U.S.A	Europe
Contents	-	-	-	-	-	-

[Product Data]

Structure : Coumarin Type

Appearance : Yellow Powder

Melting Point : 157-159°C

Decomposition Point : 327.4°C

Absorption Property (10ppm in DMF)

$\lambda_{\max}$: 401.5nm

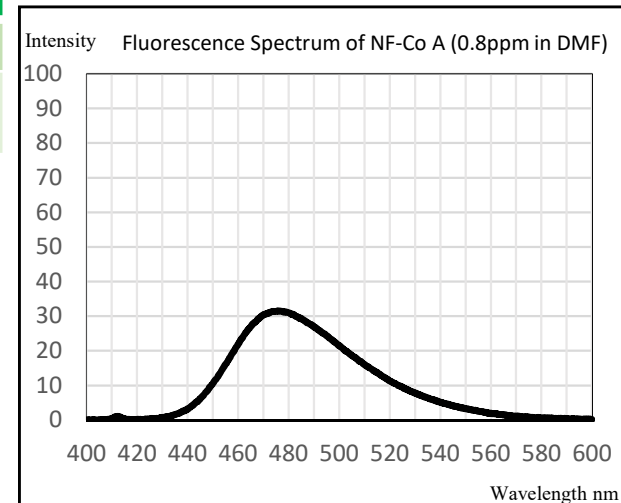
Fluorescence Property (0.8ppm in DMF)

Ex : 411.2nm

Em : 475.8nm

Intensity : 31

Fluorescence Spectrum Data(0.8ppm in DMF)



製造元：

株式会社日本化学工業所

本社 〒641-0007 和歌山市小雑賀1丁目1番11号
電話 和歌山(073)422-3111(代)

Maker：

NIPPON CHEMICAL WORKS CO., LTD.

Head Office：

1-11, Kozaika 1-chome, Wakayama City, 641-0007 Japan
Tel. Wakayama 81-73-422-3111

販売元：

日 化 株 式 会 社

本社 〒641-0007 和歌山市小雑賀1丁目1番11号
電話 和歌山(073)422-3111(代)
ファクス (073)424-7330

Selling Agency：

N I K K A C O., L T D.

Head Office：

1-11, Kozaika 1-chome, Wakayama City, 641-0007 Japan
Tel. Wakayama 81-73-422-3111
FAX. Wakayama 81-73-424-7330