

Rhodamine 610

Synonym: N-[9-(2-carboxyphenyl)-6-(diethylamino)-3H-xanthen-3-ylidene]-N-ethyl-ethanaminium chloride or perchlorate; Rhodamine B

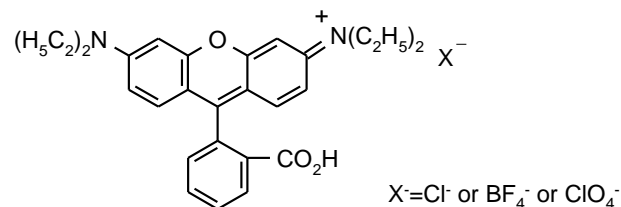
Catalog No.: 06101 (chloride); 06102 (perchlorate); 06103 (tetrafluoroborate)

CAS No.: 81-88-9 (06101); 23857-51-4 (06102); N/A (06103) **MW:** 479.02 (06101); 543.02(06102); 530.38 (06103)

Chemical Formula: C₂₈H₃₁N₂O₃.Cl (06101); C₂₈H₃₁N₂O₃.ClO₄ (06102); C₂₈H₃₁N₂O₃.BF₄ (06103)

Appearance: Green crystals or reddish-violet powder (06101); Green crystals (06102)

Structure:

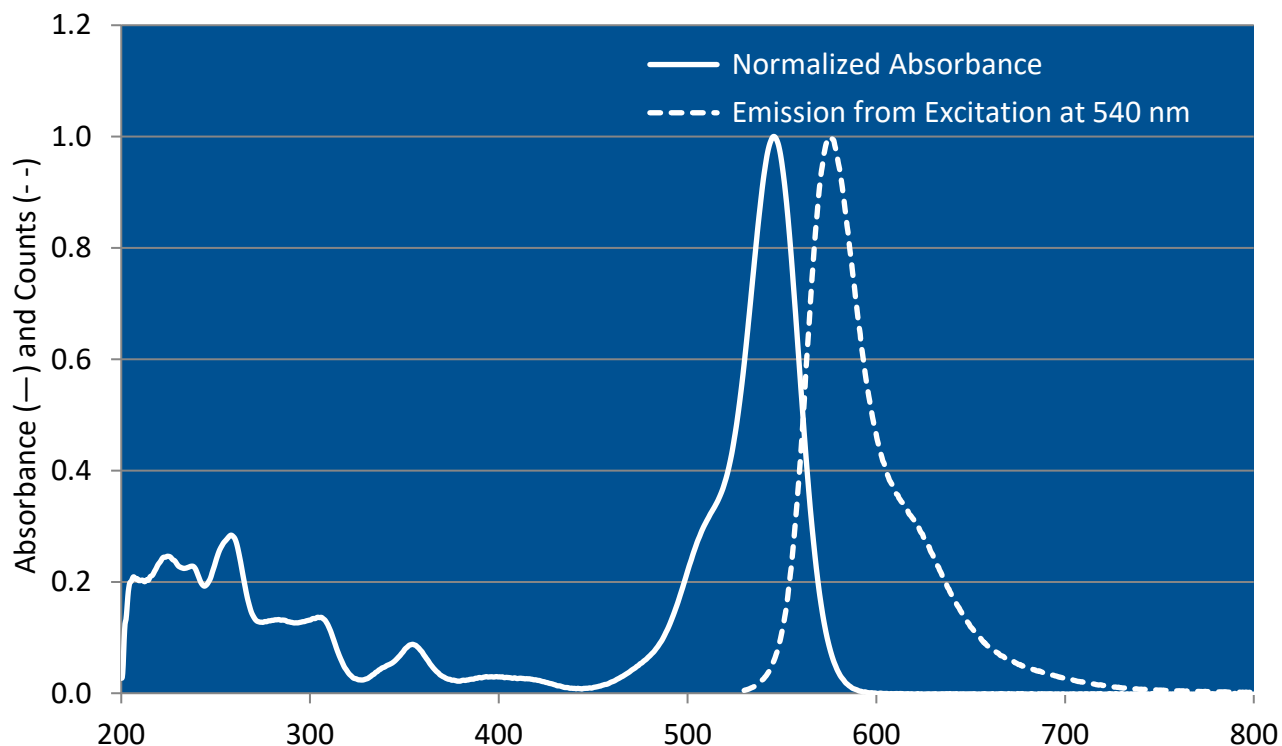


Max. Lasing Wavelength (nm)	Range (nm)	Pump Source (nm)	Solvent	Concentration (molar)	Abs λ-max	FI λ-max
613	596-645	FL ³	Methanol	8 x 10 ⁻⁵	552 ^e	588 ^e
617	598-647	FL ²⁹	Ethanol		554(a) ^e	580(a) ^e
620		FL ⁶²	Methanol	2 x 10 ⁻⁴ (KR620) + (R590)	544 ^m	
620	595-650	FL ⁶⁹	Methanol	4 x 10 ⁻⁵		
621	608-634	FL ⁶⁹	Methanol + COT			
623	598-649	FL ³	Ethanol + COT	3 x 10 ⁻⁵		
600	588-644	XeCl(308) ¹¹⁴	Methanol	1.9 x 10 ⁻³		
602	593-638	XeCl(308) ¹¹⁰	Methanol	8 x 10 ⁻⁴		
604	590-640	XeCl(308) ²⁰⁴	Methanol	1.25 x 10 ⁻³ (osc), 1.07 x 10 ⁻³ (amp)		
625	594-639	XeCl(308) ¹¹⁰	Ethanol	1.5 x 10 ⁻³		
612	596-638	XeF(351) ¹⁵⁴	Ethanol	5 x 10 ⁻³		
579	567-599	Nd:YAG(532) ⁵³	Methanol	30.6mg/l(R610)+ 69mg/l(R590)(osc); 12.4mg/l(R610)+ 34mg/l(R590)(amp)		
579	570-596	Nd:YAG(532) ⁵⁵				
580	560-596	Nd:YAG(532) ⁵	Ethanol	3.5 x 10 ⁻⁴ (R590), 5 x 10 ⁻⁵ (R610)(osc); 3.8 x 10 ⁻⁵ (KR620)(amp)		
582	576-600	Nd:YAG(532) ⁵⁷	Methanol	2.1 x 10 ⁻⁴ (osc), 3.1 x 10 ⁻⁵ (amp)		
584	576-612	Nd:YAG(532) ⁵	EtOH/H ₂ O,2/1	6.7 x 10 ⁻⁴ (R610), 3.3 x 10 ⁻³ (DSS)(osc), 3.8 x 10 ⁻⁵ (KR620)(amp)		
587	579-601	Nd:YAG(532) ⁵⁴	Methanol	3 x 10 ⁻⁴		
590	578-610	Nd:YAG(532) ⁵⁸				
591	581-607	Nd:YAG(532) ⁵³	Methanol	107mg/l(osc), 37.4mg/l(amp)		

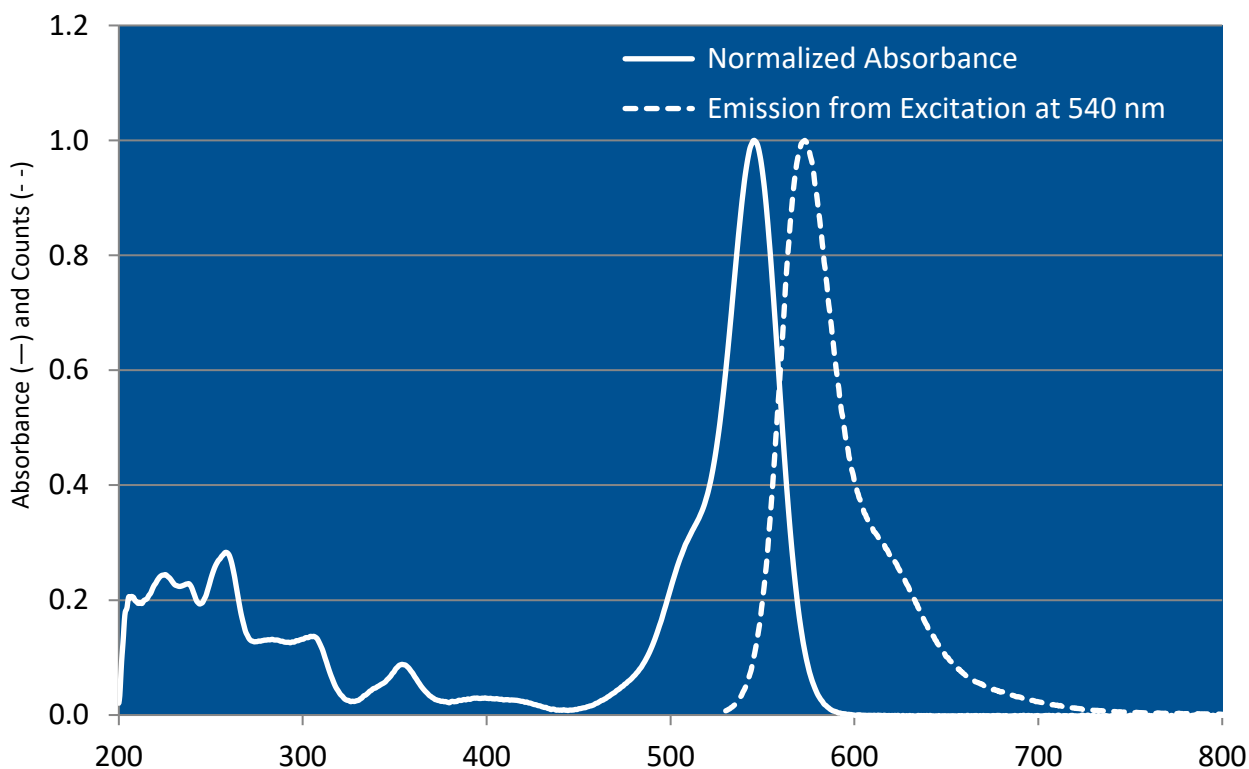
592	579-606	Nd:YAG(532) ¹¹⁰	Methanol	1×10^{-4}
596	588-614	Nd:YAG(532) ²³⁹	Ethanol	4.2×10^{-4}
600	588-632	Nd:YAG(355) ¹¹⁰	Methanol	5×10^{-4}
600	588-632	Nd:YAG(355) ²³⁹	Ethanol	7.3×10^{-4}
602	584-632	Nd:YAG(532) ⁵	Ethanol	1×10^{-3} (R610)(osc), 3.8×10^{-5} (R640)(amp)
595	588-614	N ₂ (337) ¹²²		+C540A
607	593-646	N ₂ (337) ¹¹⁴	Ethanol	3.7×10^{-3}
609	594-643	N ₂ (337) ⁵	Ethanol	5×10^{-3}
625	605-650	N ₂ (337) ¹⁸³	Methanol	48mg/20ml
630	601-675	Ar(458-514) ¹⁷	EG	2×10^{-3}
637	608-682	Ar(cw) ¹⁴	EG	
591	-582-618-	Cu(511,578) ²⁸	TFE(basic)	1.3×10^{-3}

EG = Ethylene Glycol, TFE = Trifluoroethanol, EtOH = ethanol, H₂O = water, e = ethanol, m = methanol; COT = cyclooctatetraene

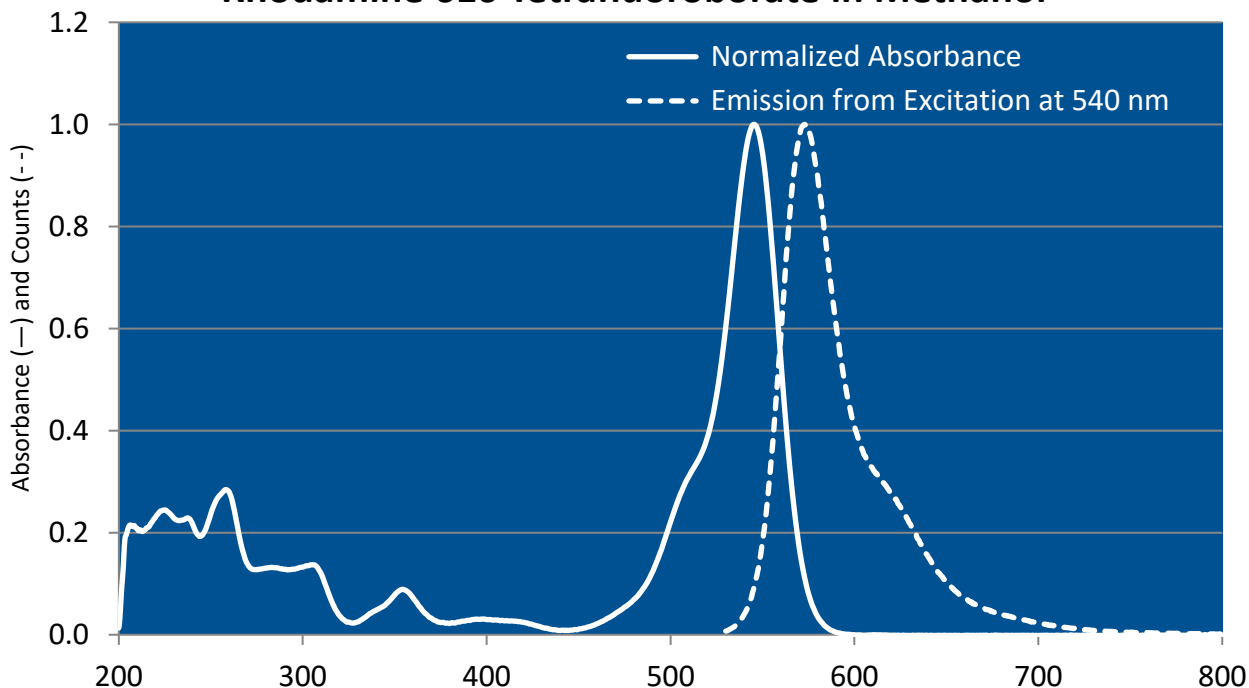
Rhodamine 610 Chloride in Methanol



Rhodamine 610 Perchlorate in Methanol



Rhodamine 610 Tetrafluoroborate in Methanol



The information presented above is believed to be accurate but is not a specification. The customer is fully responsible for determining the suitability of this product for use in their application. Exciton, Inc. does not represent that the information is sufficient or complete for any specific application.

Quantum Yields and Lifetimes

Absorbance (nm)	Emission (nm)	Quantum Yield (max = 1.0)	Solvent	Lifetime (ns)	References, Notes
	580		Ethanol	3.2	C-3
		0.67	Ethanol	2.9	R-2
		0.65	Ethanol		R-2(24)
		0.68	Ethanol		R-2(25)
			Ethanol	2.9	R-2(21,22)
	568	0.65	Basic Ethanol		R-8
		Fluorescent quantum yield relative to QSH (ff 0.55) at 25 degrees C; 1.58x10 ⁻⁷ M			
		0.57	Methanol	2.6	R-2
		0.43	Methanol	2.3	R-2(23)
		0.95	Methanol		M-5

REFERENCES:

3. Phase-R Corporation, Box G-2 Old Bay Rd., New Durham, NH 03855
5. Laser Photonics, Inc., 12351 Research Parkway, Orlando, FL 32826, formerly, Molelectron Corporation and Cooper LaserSonics, Inc.
14. CW Laser Emission Spanning the Visible Spectrum, J.M. Yarborough, *Appl. Phys. Lett.*, 24(12), 629 (1974). a. With Rhodamine 6G
17. Spectra-Physics, 1250 W. Middlefield Road, Mountain View, CA 94039
28. Efficient, High Average Power Dye Amplifiers Pumped by Copper Vapor Lasers, R.S. Hargrove and T. Kan, *IEEE J. Quantum Electron.*, QE13, 28D (1977)
29. Kiton Red S and Rhodamine B. The Spectroscopy and Laser Performance of Red Laser Dyes, J.M. Drake, R.N. Steppel and D. Young, *Chem. Phys. Lett.*, 35(2), 181 (1975)
53. Continuum, 3150 Central Expressway, Santa Clara, CA 95051, formerly, Quantel International
54. W. R. Green, private commun., 1977
55. A High-Power Dye-Laser Pumped by the Second Harmonic of a Nd-YAG Laser, W. Hartig, *Optics Commun.*, 27(3), 447 (1978)
57. Quanta-Ray, Note: Quanta-Ray is now incorporated as a part of Spectra-Physics, 1250 W. Middlefield Road, Mountain View, CA 94039
58. J.K. Lasers Ltd., Somers Road, Rugby, Warwickshire, U. K.
62. Inexpensive, Pulsed, Tunable ir Dye Laser Pumped by a Flashlamp-Driven Dye Laser, A. Passner and T. Venkatesan, *Rev. Sci. Instrum.*, 49(10), 1413 (1978)
69. Candela Laser Corporation, 530 Boston Post Road, Wayland, MA 01778-1833
110. Lumonics Inc., 105 Schneider Road, Kanata, (Ottawa), Ontario, Canada K2K 1Y3
114. Optimization of Spectral Coverage in an Eight-Cell Oscillator-Amplifier Dye Laser Pumped at 308nm, F. Bos, *Appl. Optics*, 20, 3553 (1981)
122. Increased Gain Through Identification and Alleviation of Dye Self-Absorption in Laser-Pumped Dye Laser, R.E. Drullinger, *Optics Commun.*, 39(4), 263 (1981)

154. Dye Laser Radiation in the 370-760nm Region Pumped by a XeF Excimer Laser, T.C. Eschrich and T.J. Morgan, *Applied Optics*, 24(7), 937 (1985)
183. Laser Science, Inc., 26 Landsdowne Street, Cambridge, MA 02139
204. Questek, Inc., 44 Manning Road, Billerica, MA 01821 (Tuning Curves for Model 5200B Dye Laser, PDL-3)
239. P. Jauernik, private commun., Sirah Laser- und Plasmatechnik, 2003
- C-3. Photoquenching Parameters for Commonly Used Laser Dyes, S. Speiser and N. Shakkour, *Appl. Phys. B* 38, 191 (1985), <https://doi.org/10.1007/BF00697483>
- M-5. Investigations on the Use of Laser Dyes as Quantum Counters for Obtaining Corrected Fluorescence Spectra in the Near Infrared, J.X. Duggan, J. DiCesare, and J.F. Williams, *New Directions in Molecular Luminescence*, ASTM STP 822. D. Eastwood, Ed., American Society for Testing and Materials, 1983, pp. 112-126, <https://doi.org/10.1520/STP31871S>
- R-2. Photophysical Properties of Laser Dyes: Picosecond Laser Flash Photolysis Studies of Rhodamine 6G, Rhodamine B and Rhodamine 101, P.C. Beaumont D.G. Johnson, and B.J. Parsons, *J. of Chem. Soc., Farady Trans* 89(23), 4185 (1993), <https://doi.org/10.1039/FT9938904185>
- R-8. Fluorescence Quantum Yields of Some Rhodamine Dyes, R.F. Kubin and A.N. Fletcher, *J. of Luminescence* 27, 455 (1982), [https://doi.org/10.1016/0022-2313\(82\)90045-X](https://doi.org/10.1016/0022-2313(82)90045-X)

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