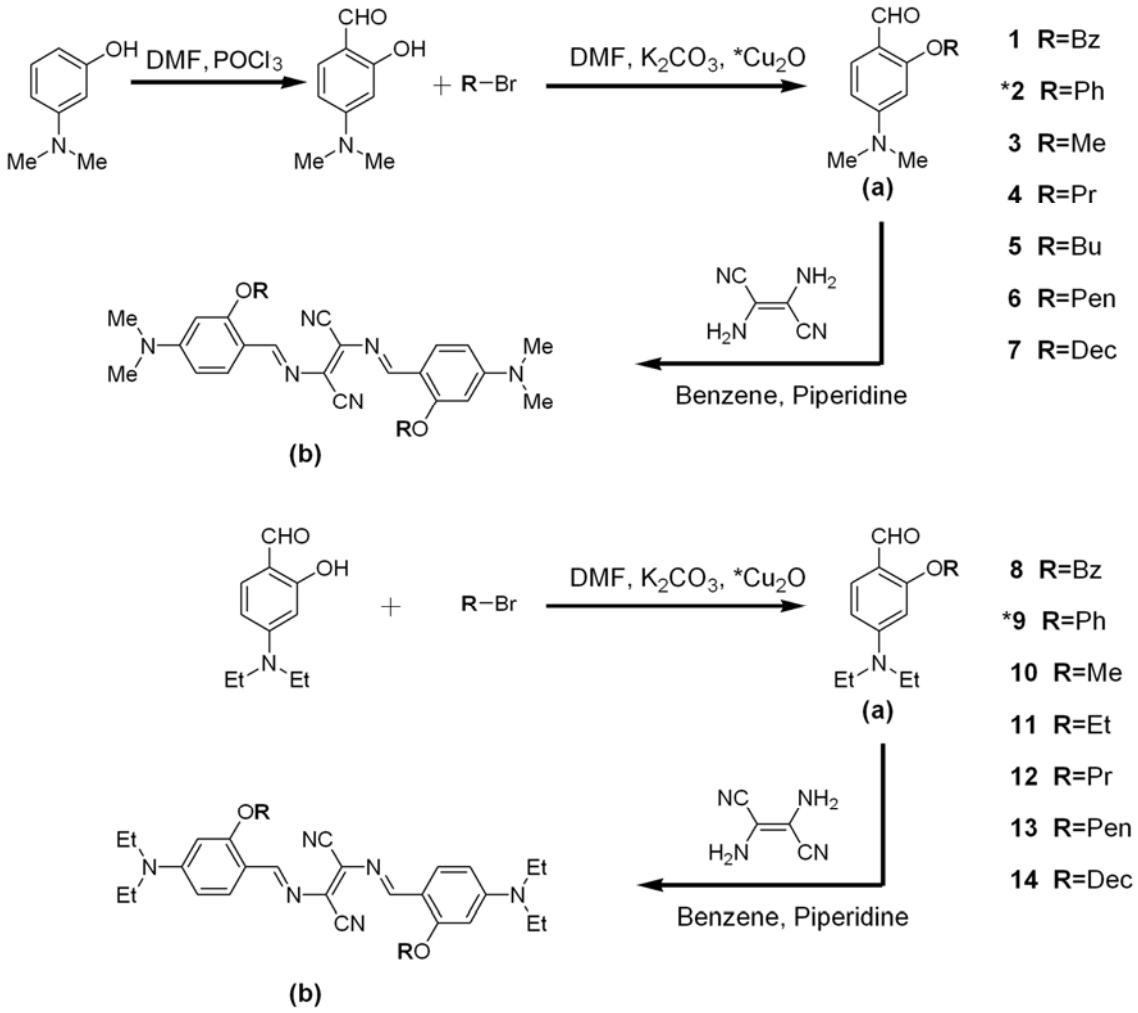

DMF, POCl3
+ R–Br
DMF, K2CO3, *Cu2O
(a)
Benzene, Piperidine
(b)
1 R=Bz
*2 R=Ph
3 R=Me
4 R=Pr
5 R=Bu
6 R=Pen
7 R=Dec
DMF, K2CO3, *Cu2O
(a)
Benzene, Piperidine
(b)
8 R=Bz
*9 R=Ph
10 R=Me
11 R=Et
12 R=Pr
13 R=Pen
14 R=Dec

Scheme 1

Dye no.	λ_{max} (nm)		λ (nm)[a]	ε_{max}	F_{max} (nm)[b,c]		F (nm)[d]	SS (nm)[e]	Φ_F (%)[f]
	In $CHCl_3$	In Film			In $CHCl_3$	In Film			
1b	546	455, 589	-91, 43	154,700	593	—[g]	—[g]	47	0.5
2b	547	541, 593	-6, 46	150,000	591	664	73	44	0.6
3b	546	649	103	138,000	593	692	99	47	0.4
4b	546	623	77	150,000	593	671	78	47	0.3
5b	546	612	66	147,500	593	652	59	47	0.6
6b	546	605	59	138,000	593	656	63	47	0.5
7b	547	604	57	143,700	593	644	51	46	0.6
8b	555	440, 587	-75, 32	137,800	601	—[g]	—[g]	46	0.2
9b	550	615	65	134,800	597	647	50	47	0.4
10b	556	659	103	123,000	601	680	79	45	0.6
11b	556	621	65	124,300	601	650	49	45	1.4
12b	557	621	64	124,500	601	652	51	44	0.9
13b	555	601	46	125,900	601	640	39	46	1.4
14b	555	596	41	128,500	601	624	23	46	1.5

[a] $\Delta\lambda = \lambda_{max}$ (film) $-$ λ_{max} (solution).

[b] F_{max} (solution) excited at λ_{max} (solution) value.

[c] Solid state F_{max} excited at λ_{max} (film) value.

[d] $\Delta F = F_{max}$ (solid) $-$ F_{max} (solution).

[e] Stokes shift, F_{max} $-$ λ_{max} in $CHCl_3$ solution.

[f] Fluorescence quantum yield.

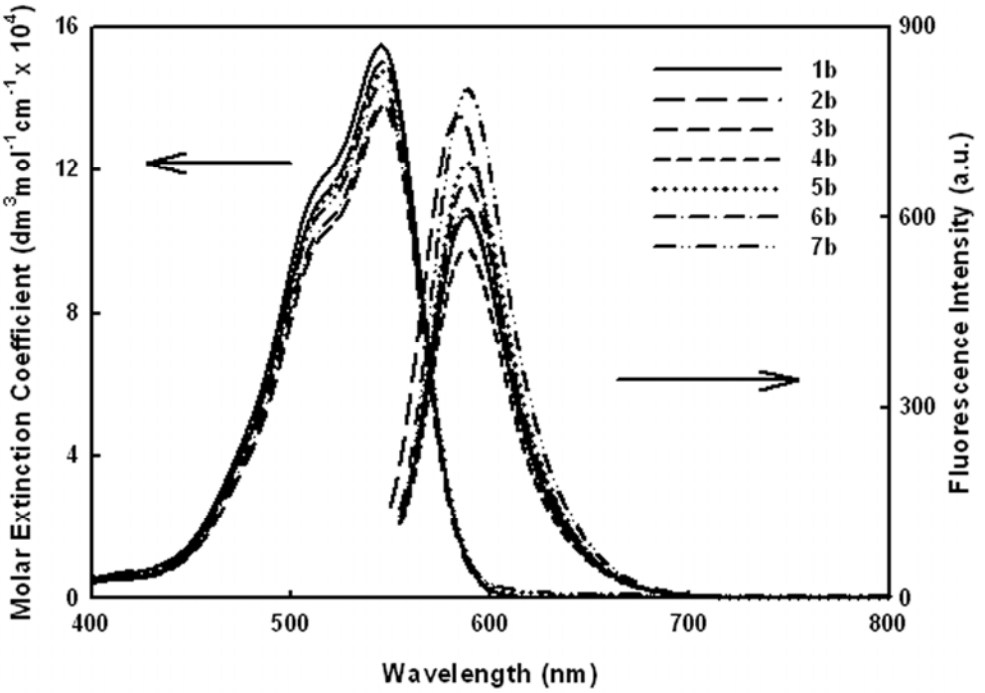
[g] No fluorescence detected.

Table 1. Calculated absorption parameters for the optimized molecular geometry.

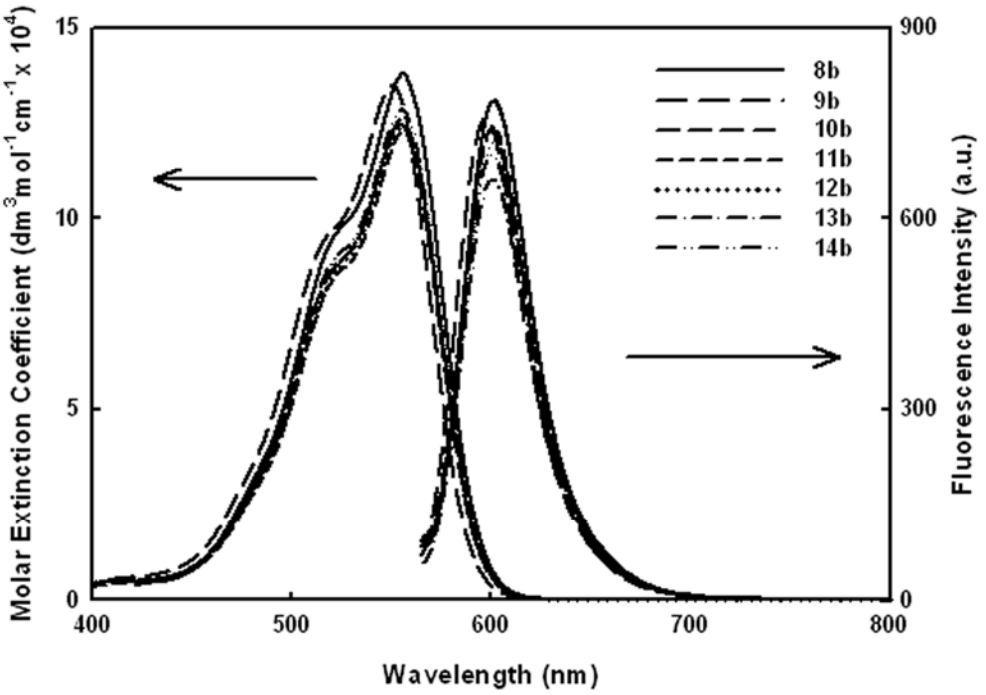
Dye no.	λ_{max}/nm	Dye no.	λ_{max}/nm
1b	397 (1.9490[a])	**8b**	398 (2.0132[a])
2b	395 (2.0438[a])	**9b**	398 (2.0523[a])
3b	393 (1.8960[a])	**10b**	400 (1.9488[a])
4b	394 (1.9010[a])	**11b**	400 (1.9430[a])
5b	393 (1.8935[a])	**12b**	399 (1.9462[a])
6b	392 (1.9075[a])	**13b**	399 (1.9490[a])
7b	393 (1.9008[a])	**14b**	400 (1.9499[a])

[a]Oscillator strength.

Table 2. Absorption and fluorescence characteristics for **1b–14b** in solution and in solid films.

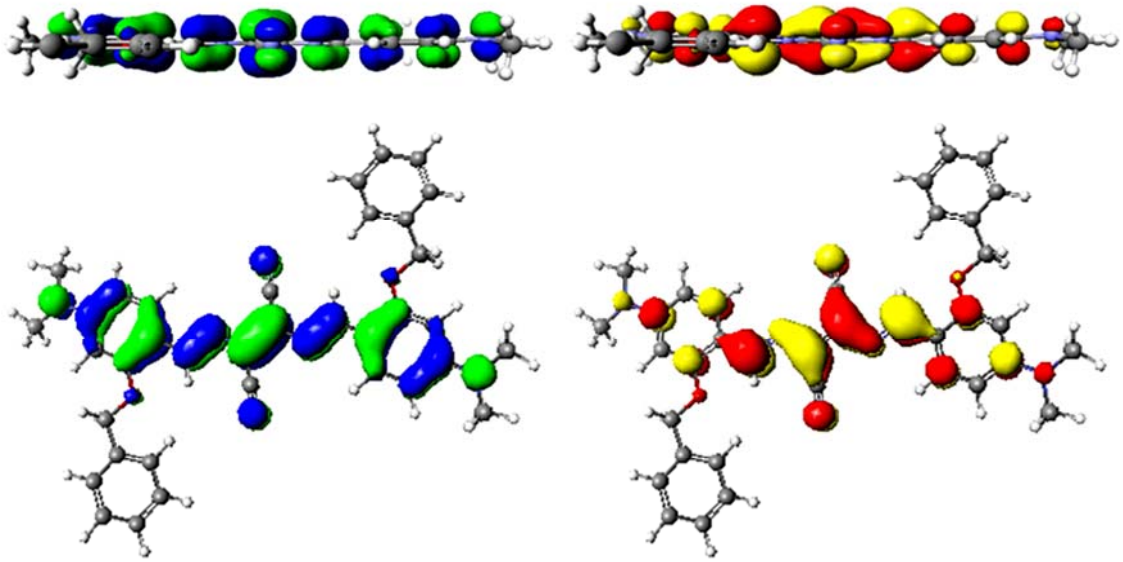


(a)

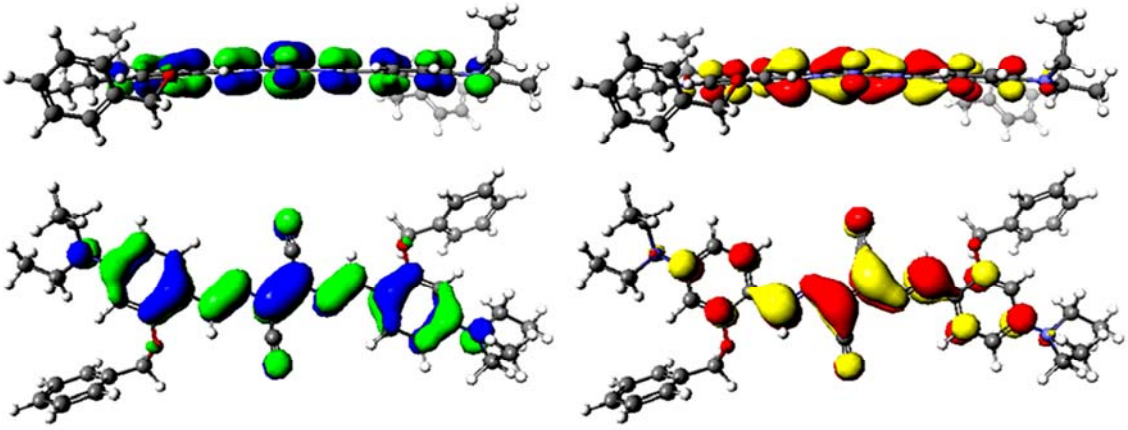


(b)

Fig. 1. Absorption and fluorescence spectra of **1b–7b** (a) and **8b**–**14b** (b) in chloroform solution. The concentration of dyes for fluorescence is ca. 1.0×10^{-5} M.

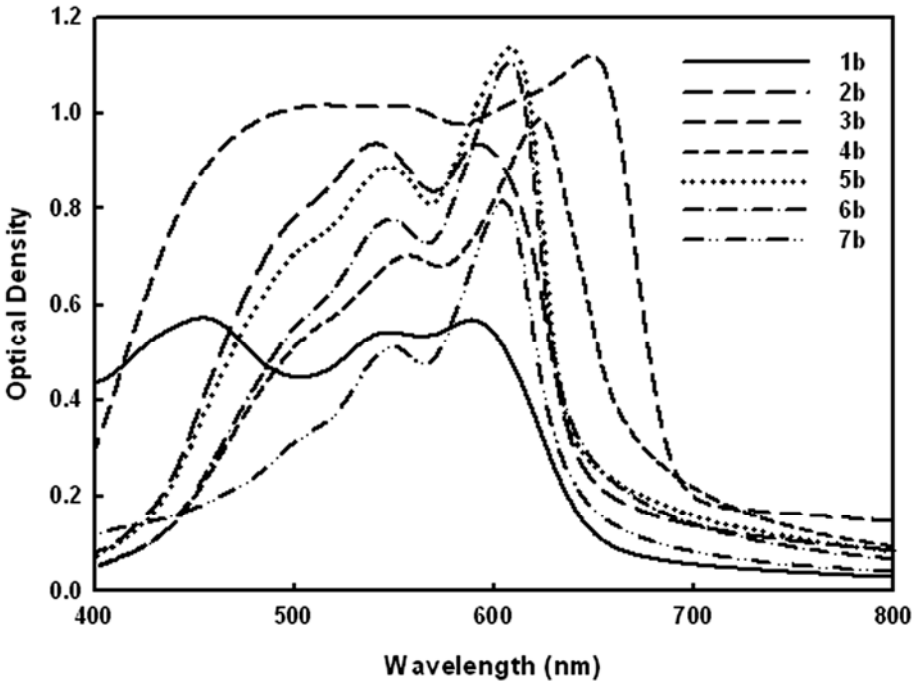


(a)

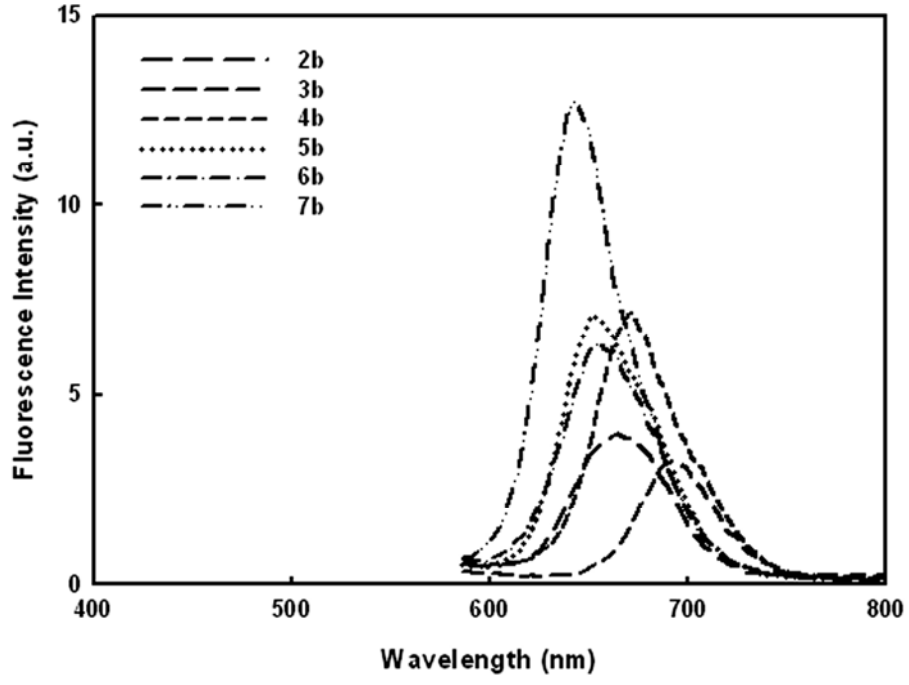


(b)

Fig. 2. Optimized molecular geometry for **1b** (a) and **8b** (b).

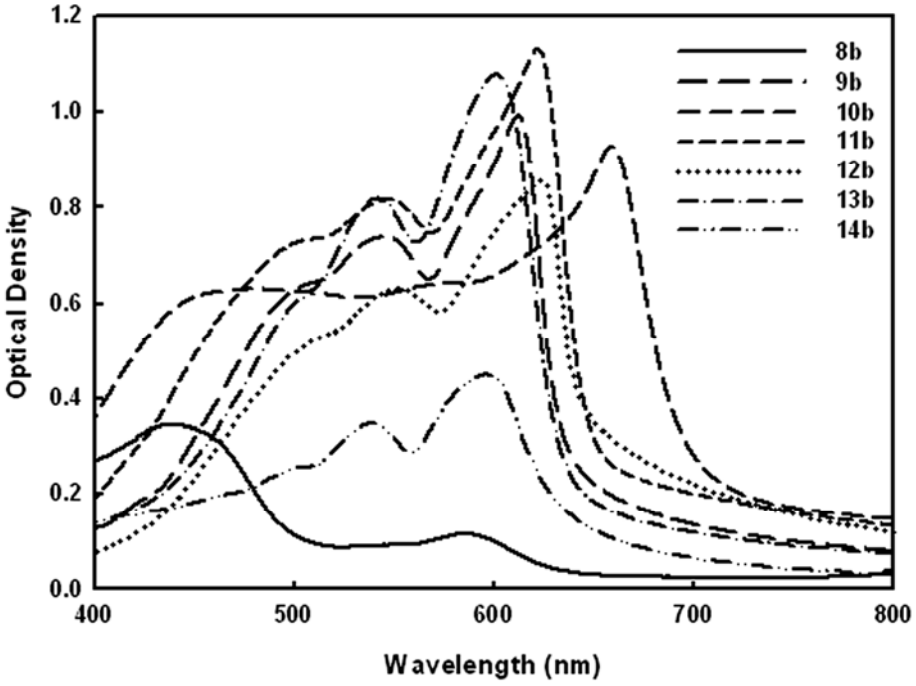


(a)

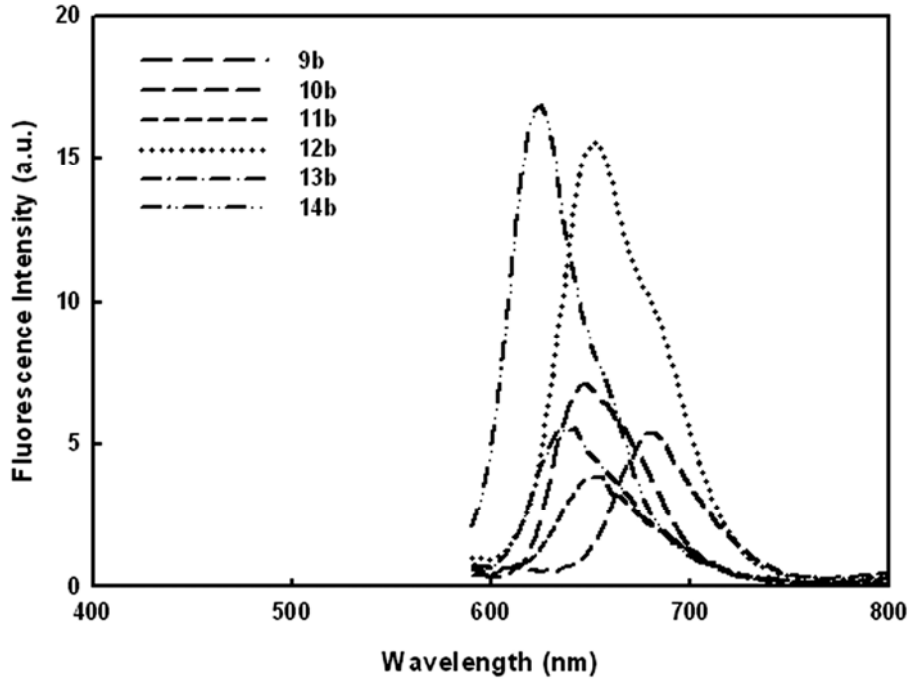


(b)

Fig. 3. Absorption (a) and fluorescence (b) spectra of **1b**–**7b** in vapour-deposited films.



(a)



(b)

Fig. 4. Absorption (a) and fluorescence (b) spectra of **8b–14b** in vapour-deposited films.

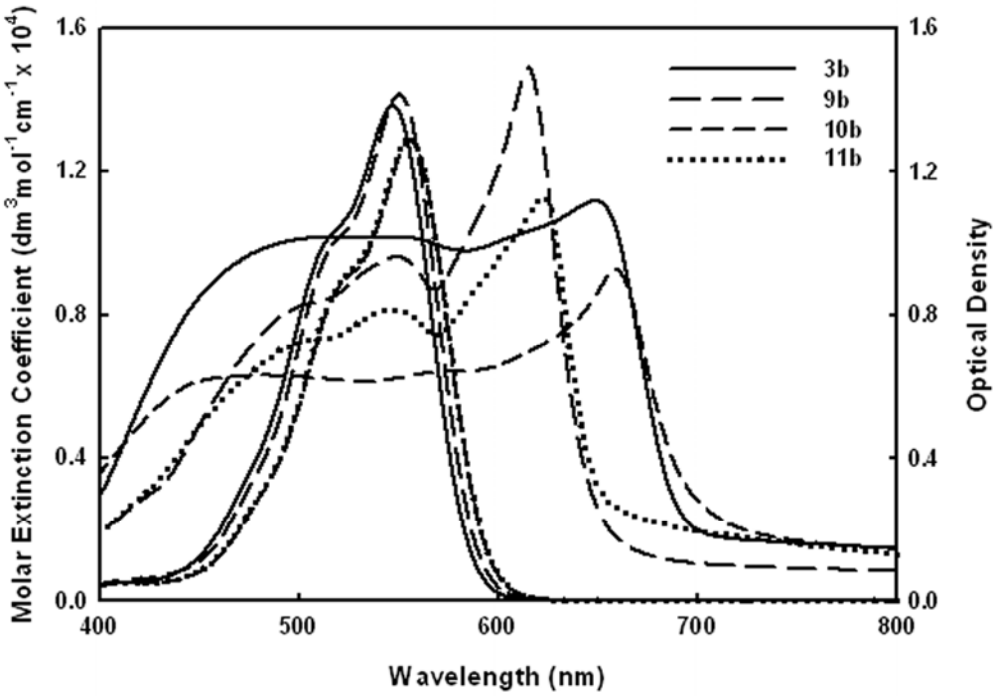


Fig. 5. Absorption spectra of **3b**, **9b**, **10b** and **11b** in vapour-deposited films, as well as the spectra in chloroform.