

## 7.- ANEXOS

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### 7.1. Instrumentación

Los *puntos de fusión* se han medido en un Gallenkamp.

Los *espectros de IR* se han llevado a cabo en un espectrofotómetro Perkin Elmer 1600FT en suspensión de Nujol o pastilla de KBr. Las vibraciones se expresan en número de ondas ( $\text{cm}^{-1}$ ).

Los *espectros de resonancia magnética nuclear* se han registrado en un Bruker AV-300, a 300 MHz para  $^1\text{H}$ -RMN y a 100 MHz para  $^{13}\text{C}$ -RMN, o en un Bruker ARX-300, a 300 MHz para  $^1\text{H}$ -RMN y a 75 MHz para  $^{13}\text{C}$ -RMN; o en un Bruker AV-400, a 400 MHz para  $^1\text{H}$ -RMN y a 100 MHz para  $^{13}\text{C}$ -RMN.

Los *espectros MALDI<sup>+</sup>* se registraron en un Bruker MicroFlex que utiliza en láser de nitrógeno (3,68 eV) utilizando ditranol (1,8,9-Antraceno-triol) o ácido 2,5-dihidroxibenzóico como matriz y operando el analizador en modo reflector.

Los *espectros de HRMS-ESI<sup>+</sup>* se registraron en un Bruker MicroTOF-Q, usando formiato de sodio como referencia externa.

Los *espectros ESI<sup>+</sup> de baja resolución* se registraron en un esquire 3000+.

La purificación de los productos finales por *cromatografía en columna* se ha llevado a cabo empleando una bomba de media presión, modelo Buchi C-605 con controlador C-615 y columnas Omnifit de diferentes diámetros.

Los *espectros de absorción UV-visible* se han realizado en un espectrofotómetro UNICAM UV4. Los resultados se expresan en nm.

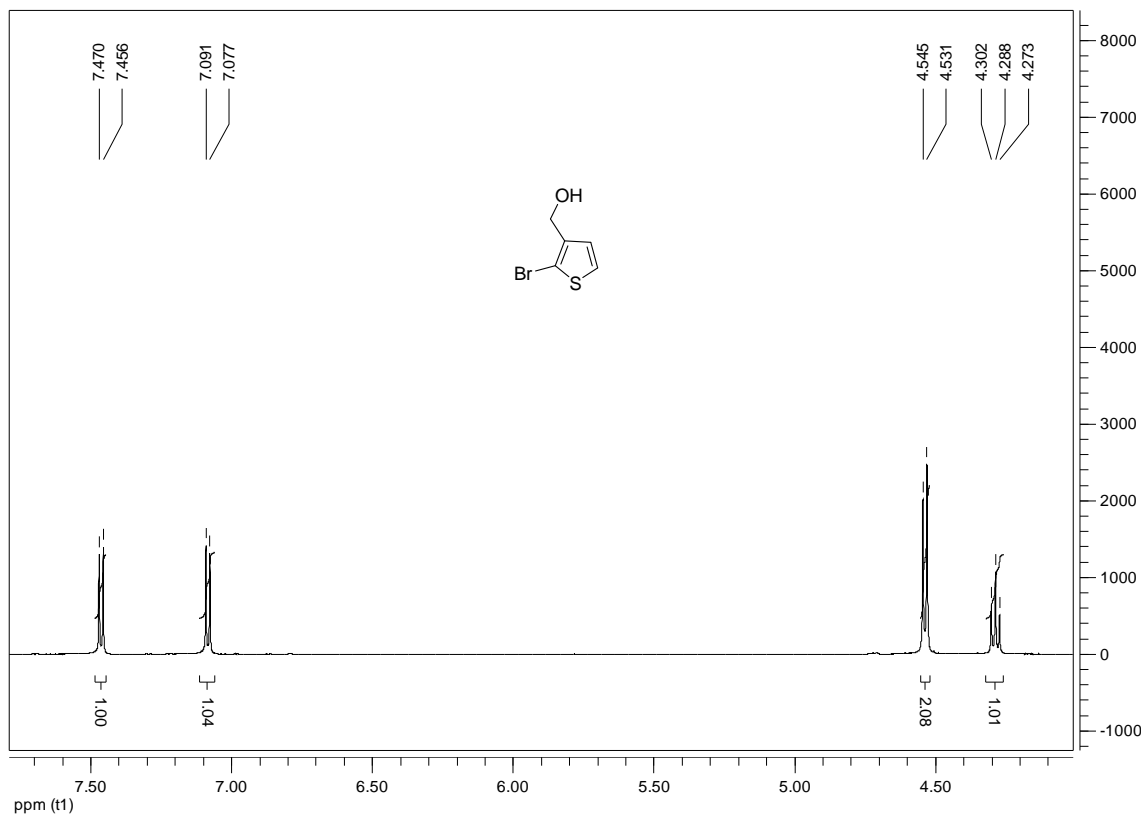
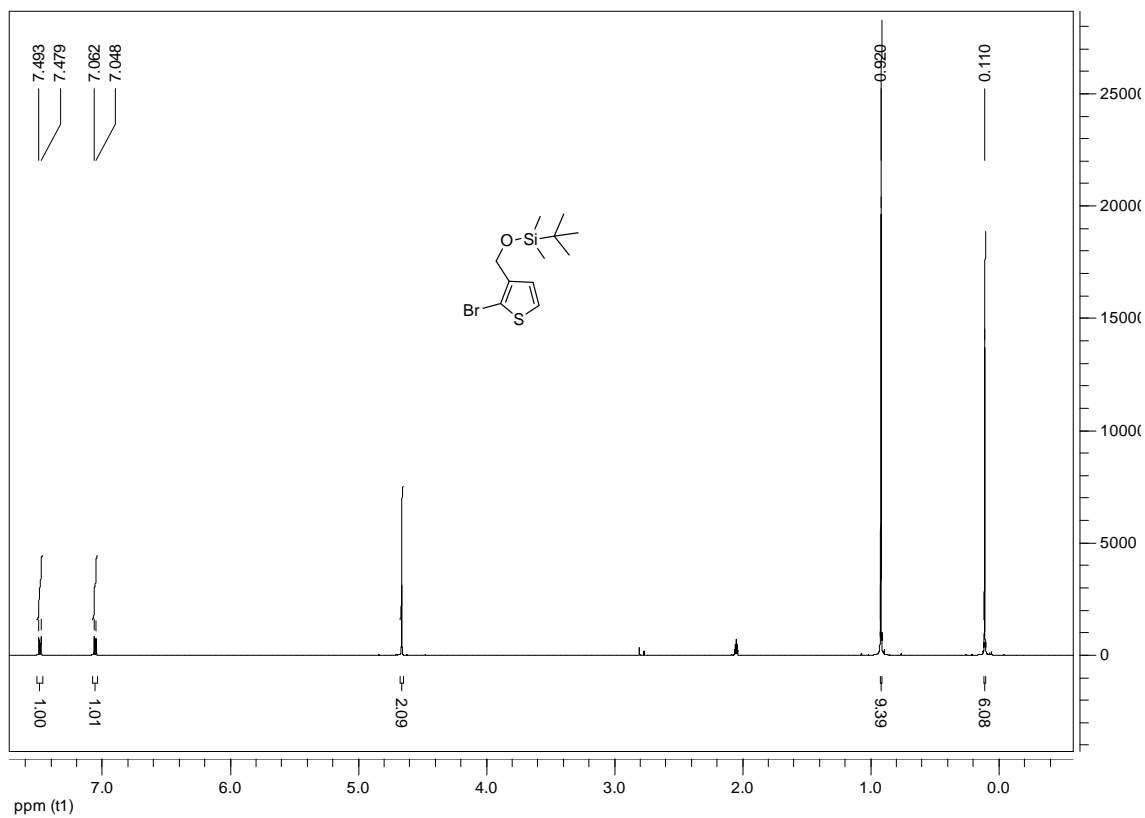
Los *espectros de Voltametría de Pulso Diferencial* se han llevado a cabo en un potencióstato  $\mu$ -Autolab ECO-Chemie, utilizando como electrodo de trabajo uno de grafito, electrodo de referencia Ag/AgCl y un electrodo de platino como contraelectrodo.

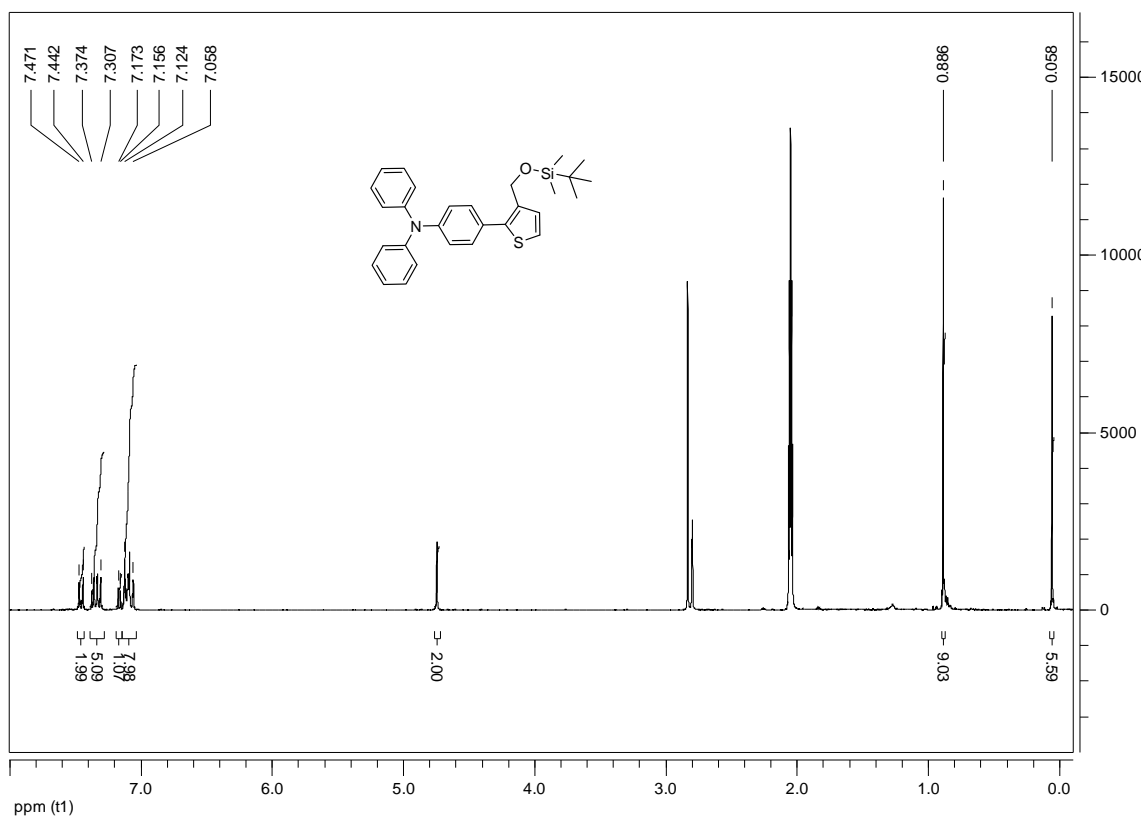
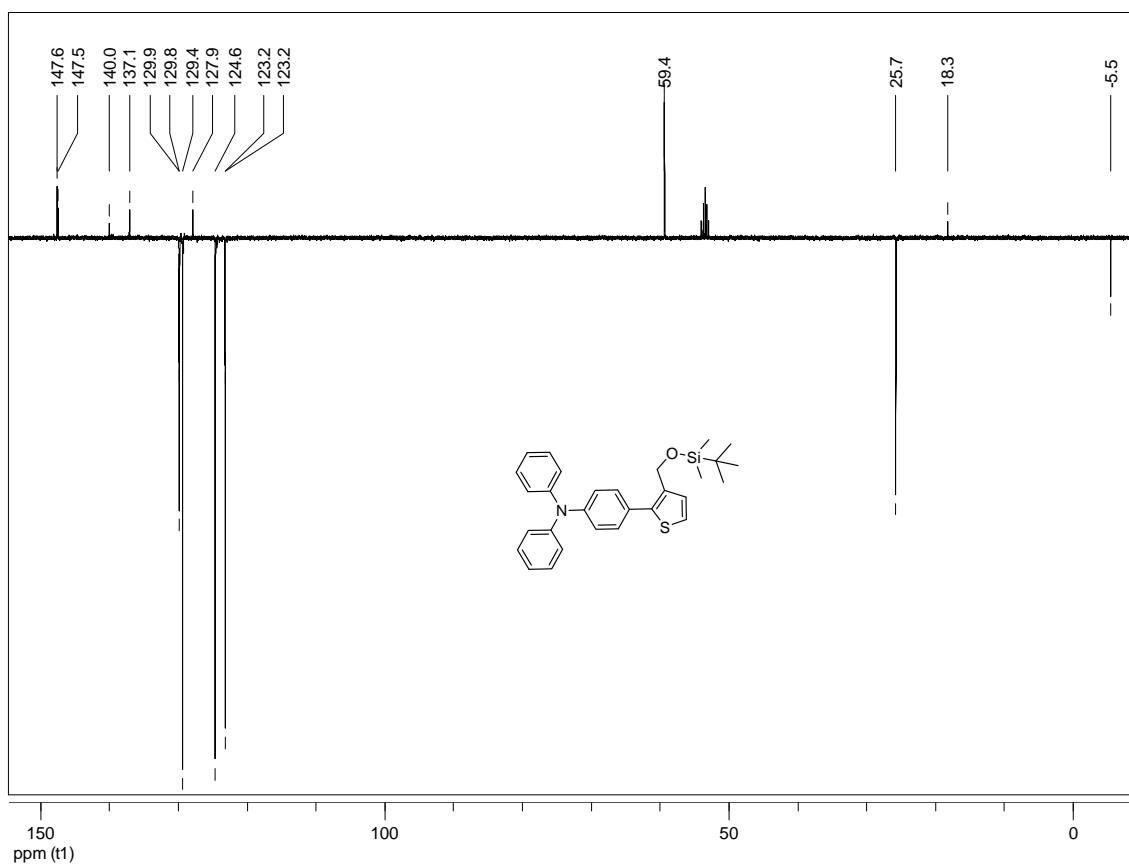
## 7.2. Espectros y gráficos

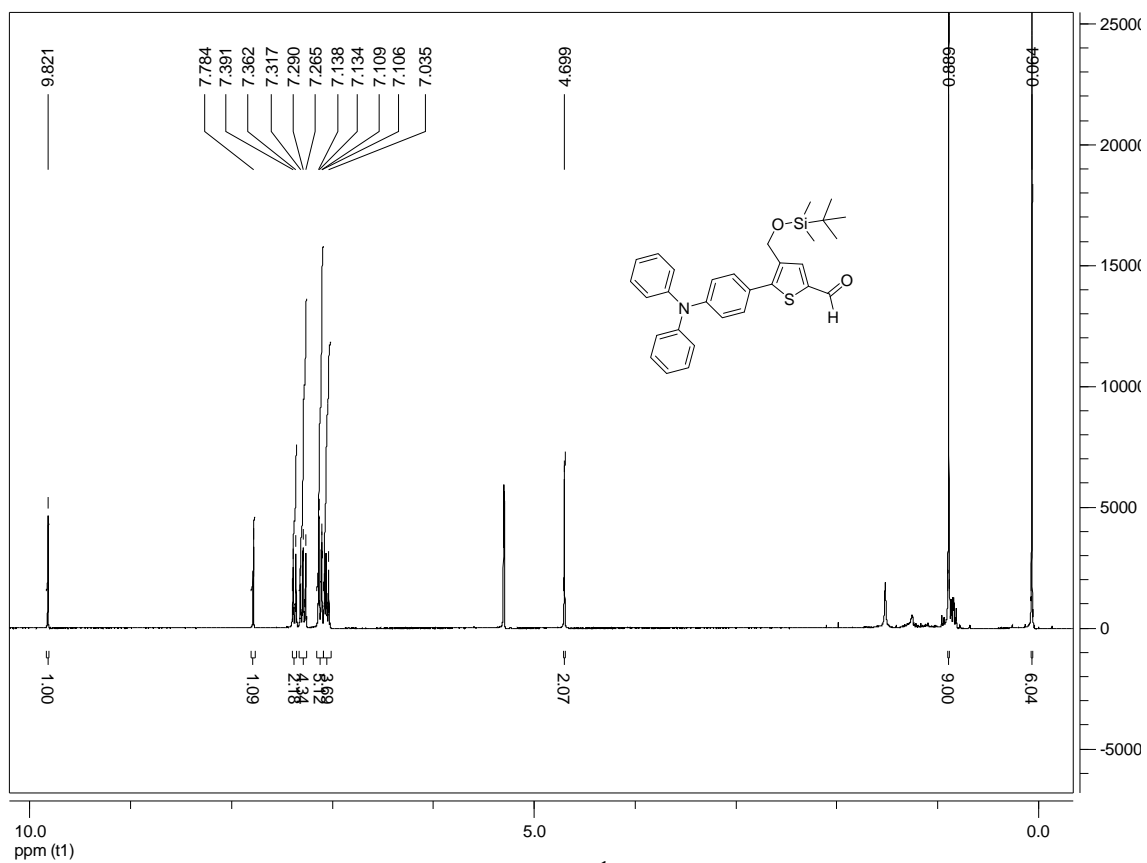
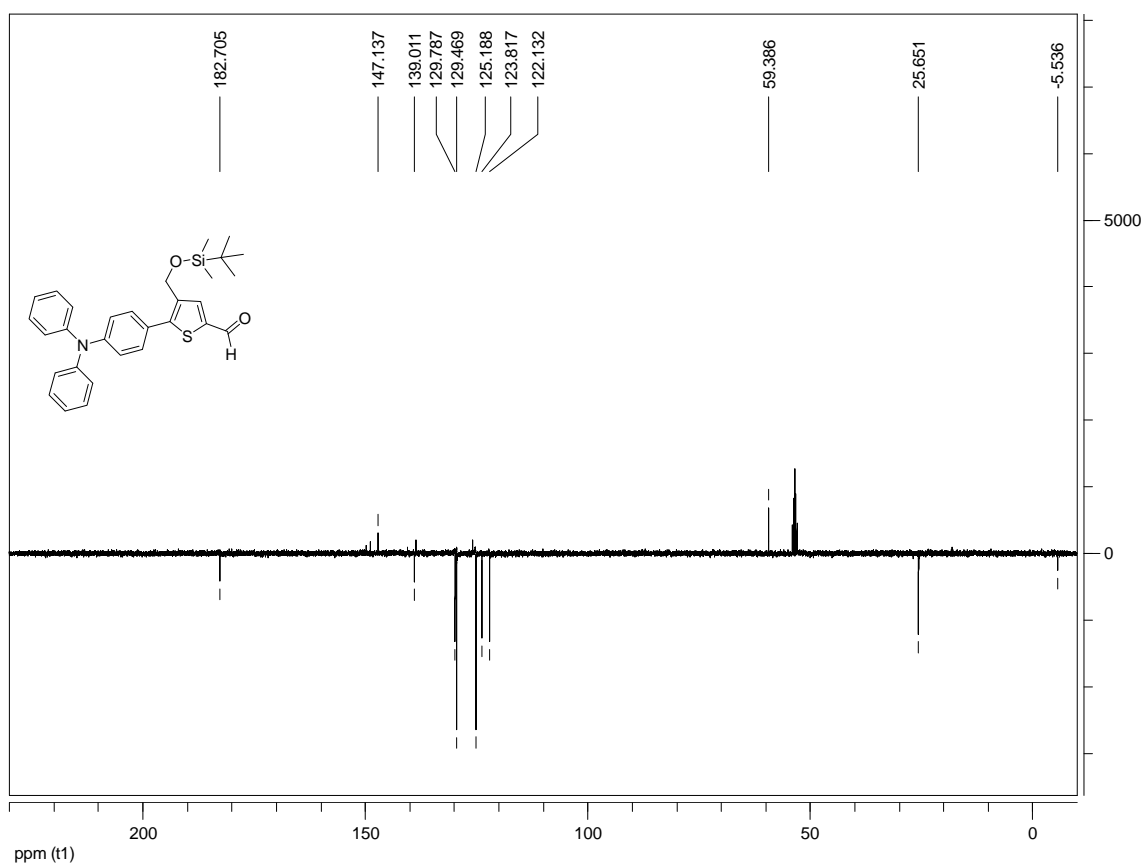
Referencia	Espectros	Figura
(1)	$^1\text{H}$ -RMN	7.1
(2)	$^1\text{H}$ -RMN	7.2
(3)	$^1\text{H}$ -RMN	7.3
	$^{13}\text{C}$ -RMN	7.4
(4)	$^1\text{H}$ -RMN	7.5
	$^{13}\text{C}$ -RMN	7.6
	IR	7.7
	HRMS (ESI <sup>+</sup> )	7.8
(5)	$^1\text{H}$ -RMN	7.9
	$^{13}\text{C}$ -RMN	7.10
	IR	7.11
	HRMS (ESI <sup>+</sup> )	7.12
(6)	$^1\text{H}$ -RMN	7.13
	$^{13}\text{C}$ -RMN	7.14
	IR	7.15
	HRMS (ESI <sup>+</sup> )	7.16
(7)	$^1\text{H}$ -RMN	7.17
	$^{13}\text{C}$ -RMN	7.18
	IR	7.19
	HRMS (ESI <sup>+</sup> )	7.20
(8)	$^1\text{H}$ -RMN	7.21
	$^{13}\text{C}$ -RMN	7.22
	IR	7.23
	HRMS (ESI <sup>+</sup> )	7.24
(9)	$^1\text{H}$ -RMN	7.25
	$^{13}\text{C}$ -RMN	7.26
	HSQC	7.27
	IR	7.28
	HRMS (ESI <sup>+</sup> )	7.29
(10)	$^1\text{H}$ -RMN	7.30
	$^{13}\text{C}$ -RMN	7.31
	IR	7.32
	HRMS (ESI <sup>+</sup> )	7.33
(11)	$^1\text{H}$ -RMN	7.34
	$^{13}\text{C}$ -RMN	7.35
	IR	7.36
	HRMS (ESI <sup>+</sup> )	7.37
(12)	$^1\text{H}$ -RMN	7.38
	$^{13}\text{C}$ -RMN	7.39
	HSQC	7.40
	IR	7.41
(13)	HRMS (ESI <sup>+</sup> )	7.42
	$^1\text{H}$ -RMN	7.43
	$^{13}\text{C}$ -RMN	7.44
	IR	7.45
	HRMS (ESI <sup>+</sup> )	7.46

<b>(14)</b>	<sup>1</sup> H-RMN	7.47
	<sup>13</sup> C-RMN	7.48
	IR	7.49
	HRMS (ESI <sup>+</sup> )	7.50
	UV-visible	7.51
	DPV	7.52
<b>(15)</b>	<sup>1</sup> H-RMN	7.53
	<sup>13</sup> C-RMN	7.54
	COSY	7.55
	IR	7.56
	HRMS (ESI <sup>+</sup> )	7.57
	UV-visible	7.58
	DPV	7.59

Gráfico	Figura
$\lambda_{\text{CORTE}}$ UV-visible/fluorescencia de (14)	7.60
$\lambda_{\text{CORTE}}$ UV-visible/fluorescencia de (15)	7.61
Diagrama niveles HOMO-LUMO de (14) y (15)	7.62

Figura 7.1. Espectro <sup>1</sup>H-RMN de (1).Figura 7.2. Espectro <sup>1</sup>H-RMN de (2).

Figura 7.3. Espectro  $^1\text{H}$ -RMN de (3).Figura 7.4. Espectro  $^{13}\text{C}$ -RMN de (3).

Figura 7.5. Espectro  $^1\text{H-RMN}$  de (4).Figura 7.6. Espectro  $^{13}\text{C-RMN}$  de (4).

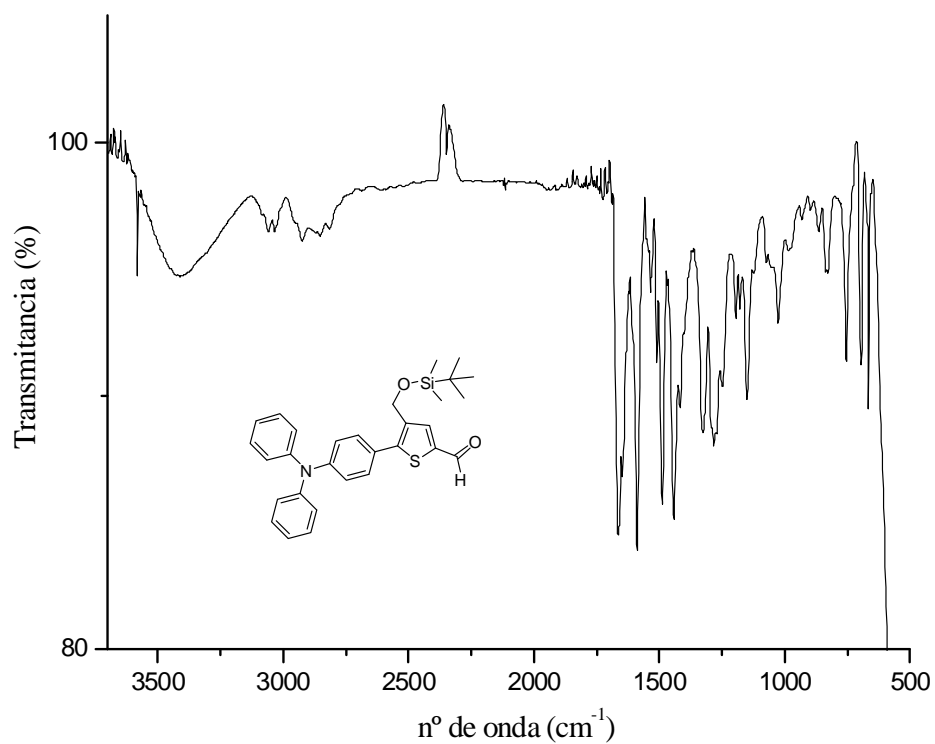
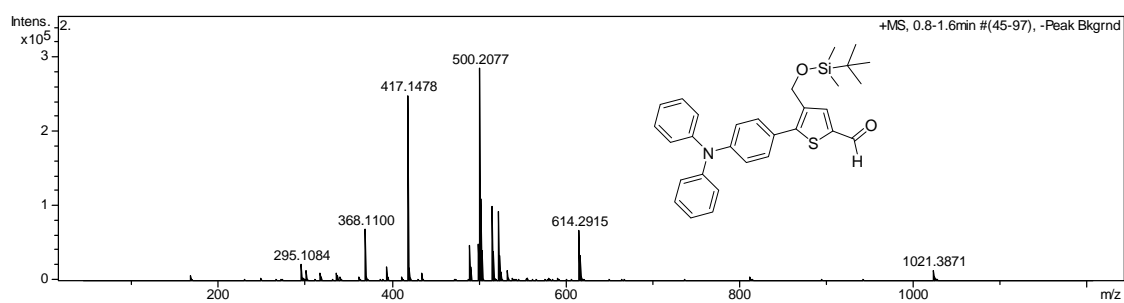
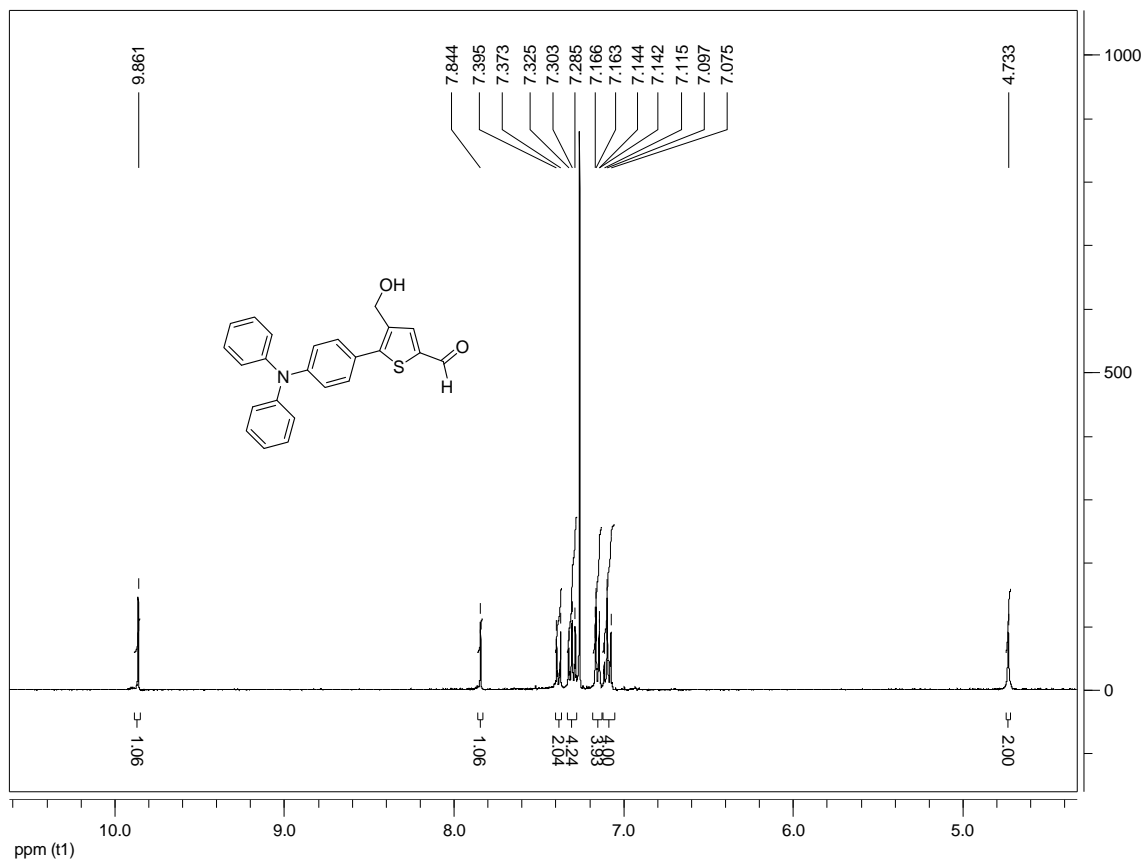
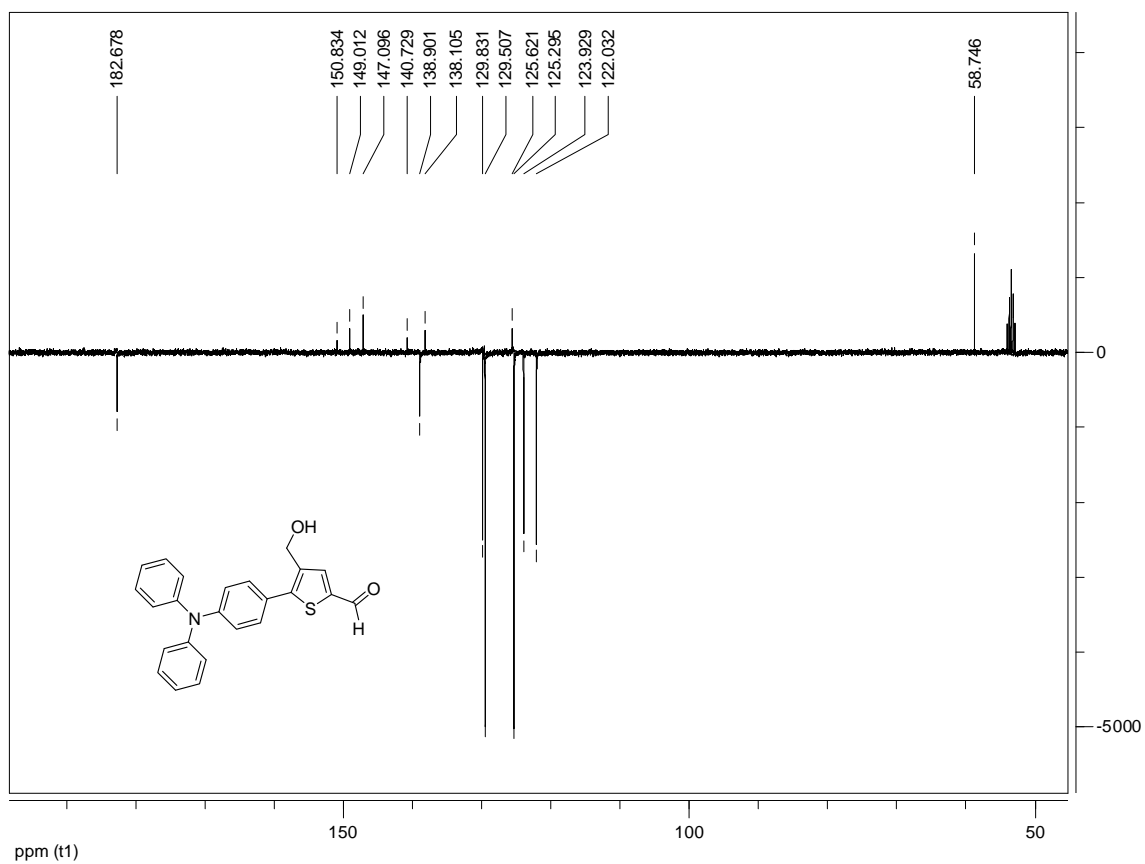


Figura 7.7. Espectro IR de (4).

Figura 7.8. Espectro HRMS (ESI<sup>+</sup>) de (4).



Figura 7.9. Espectro  $^1\text{H-RMN}$  de (5).Figura 7.10. Espectro  $^{13}\text{C-RMN}$  de (5).

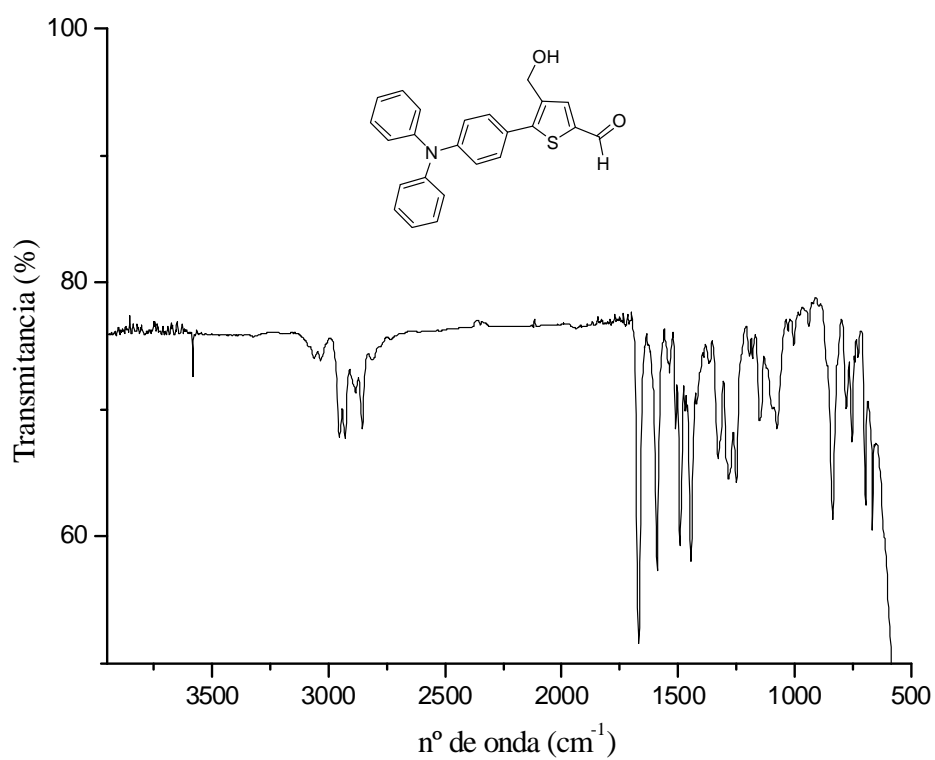
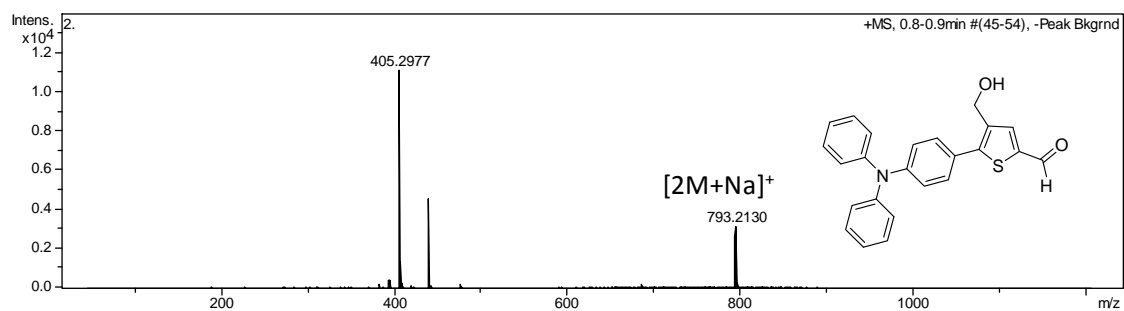
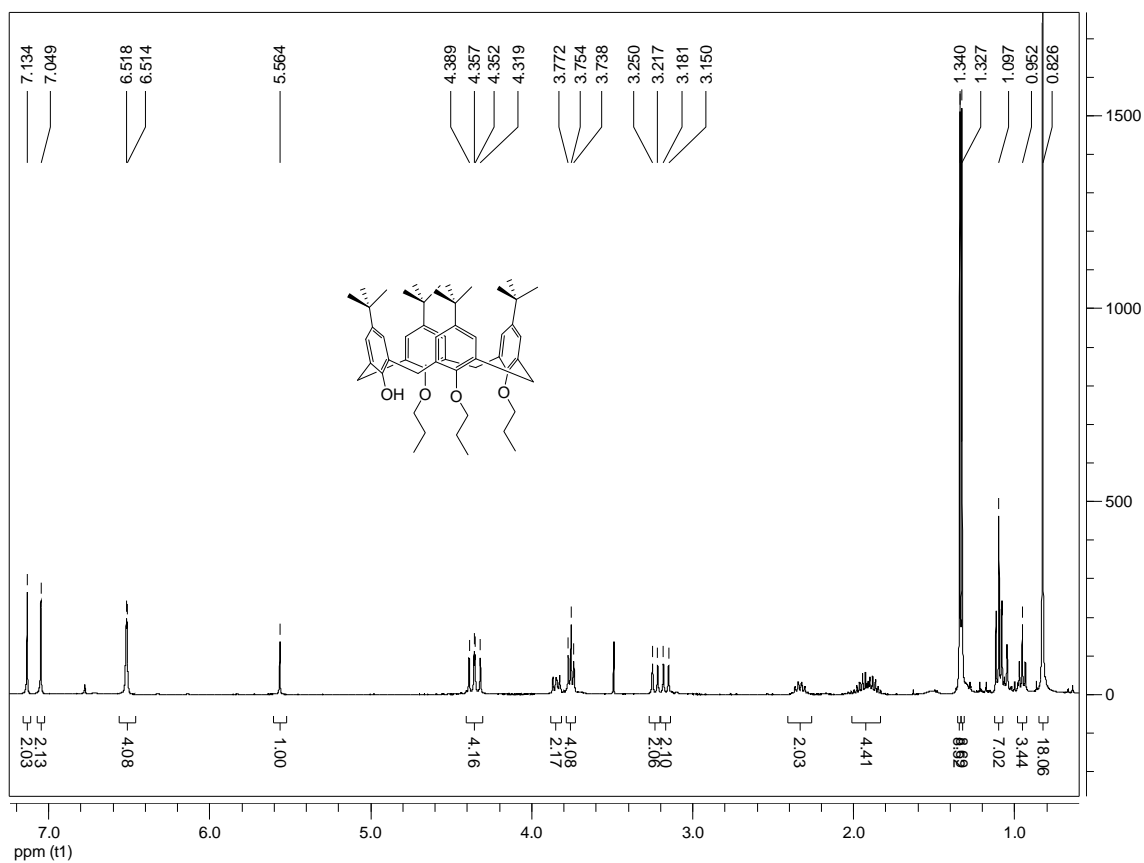
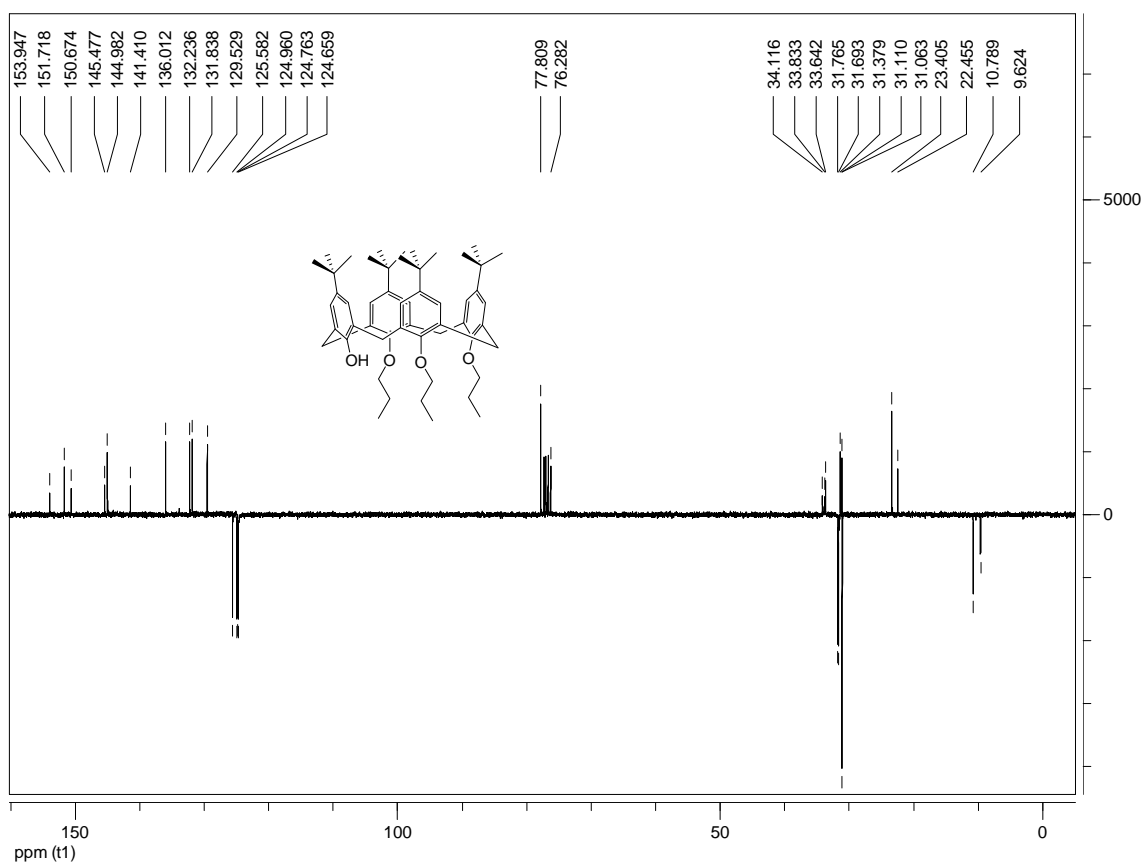


Figura 7.11. Espectro IR de (5).

Figura 7.12. Espectro HRMS (ESI<sup>+</sup>) de (5).

Figura 7.13. Espectro  $^1\text{H}$ -RMN de (6).Figura 7.14. Espectro  $^{13}\text{C}$ -RMN de (6).

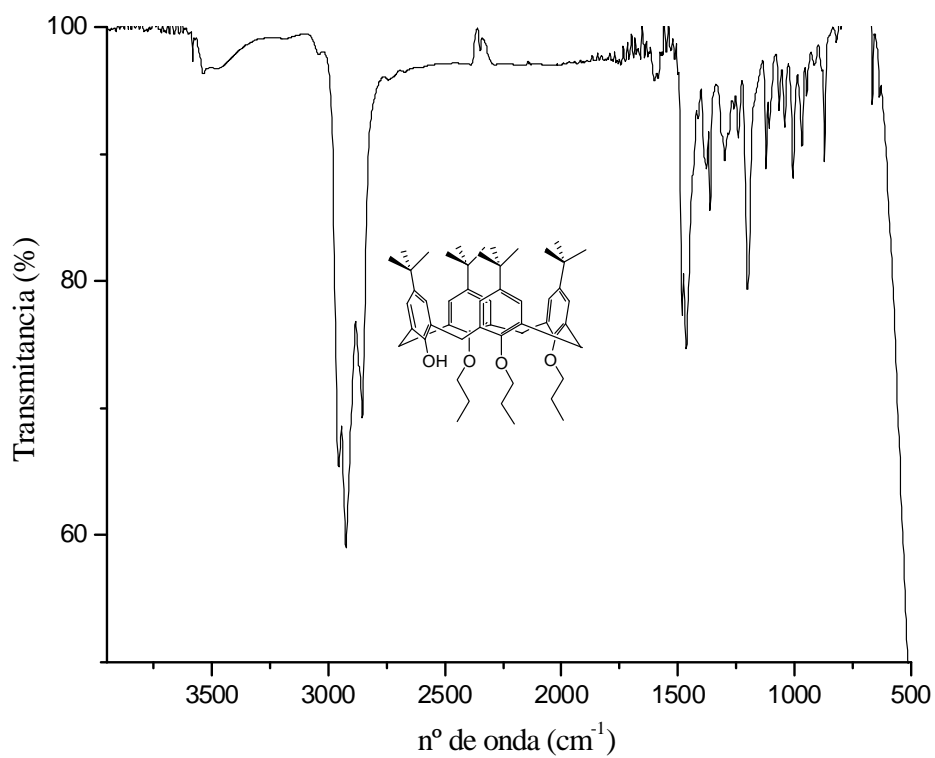
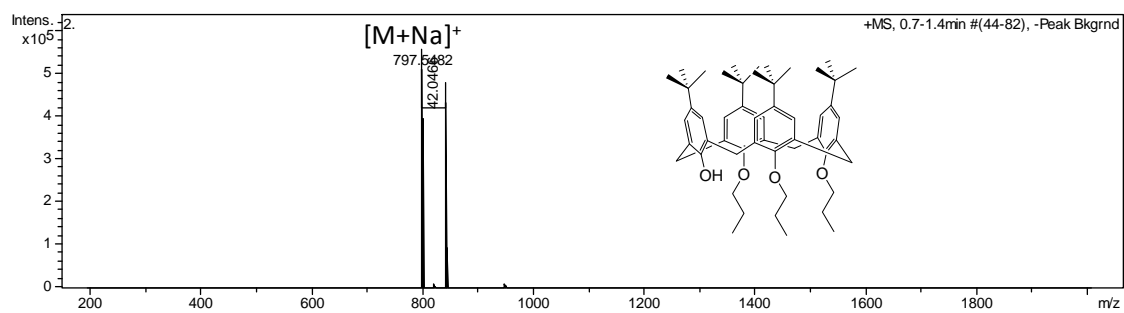
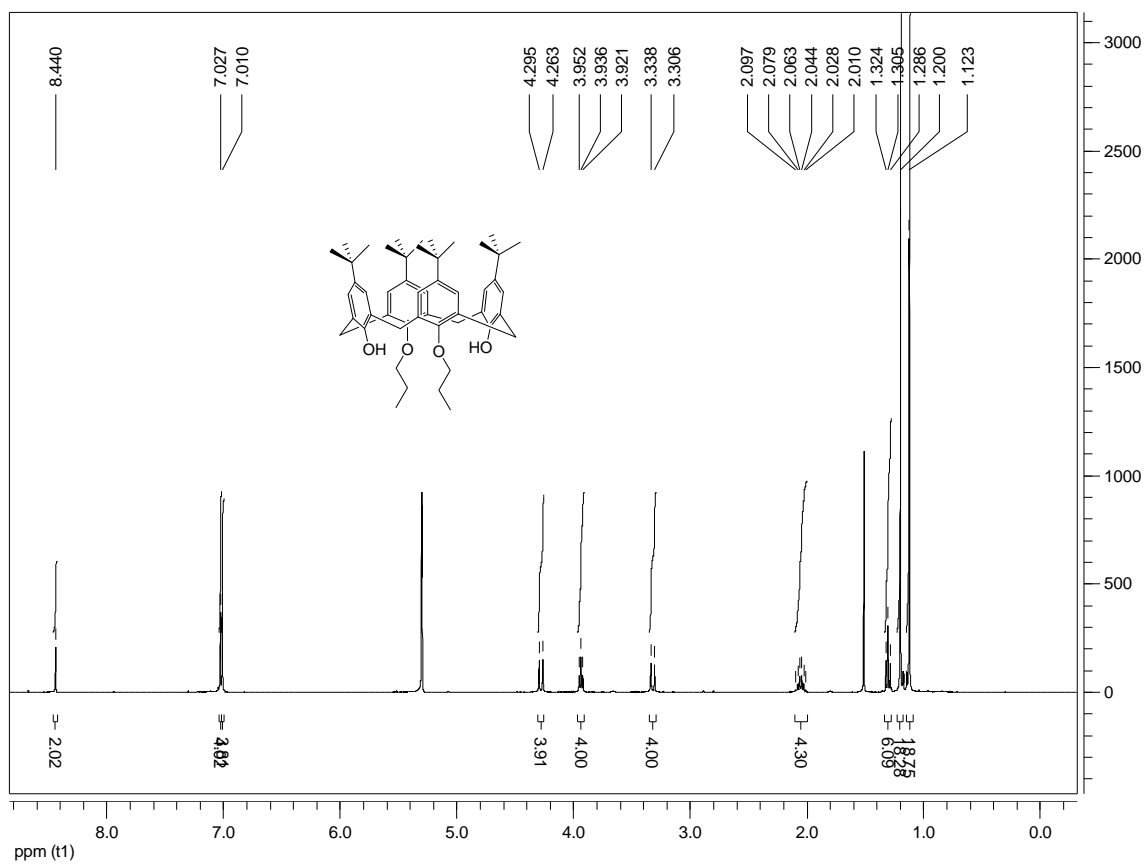
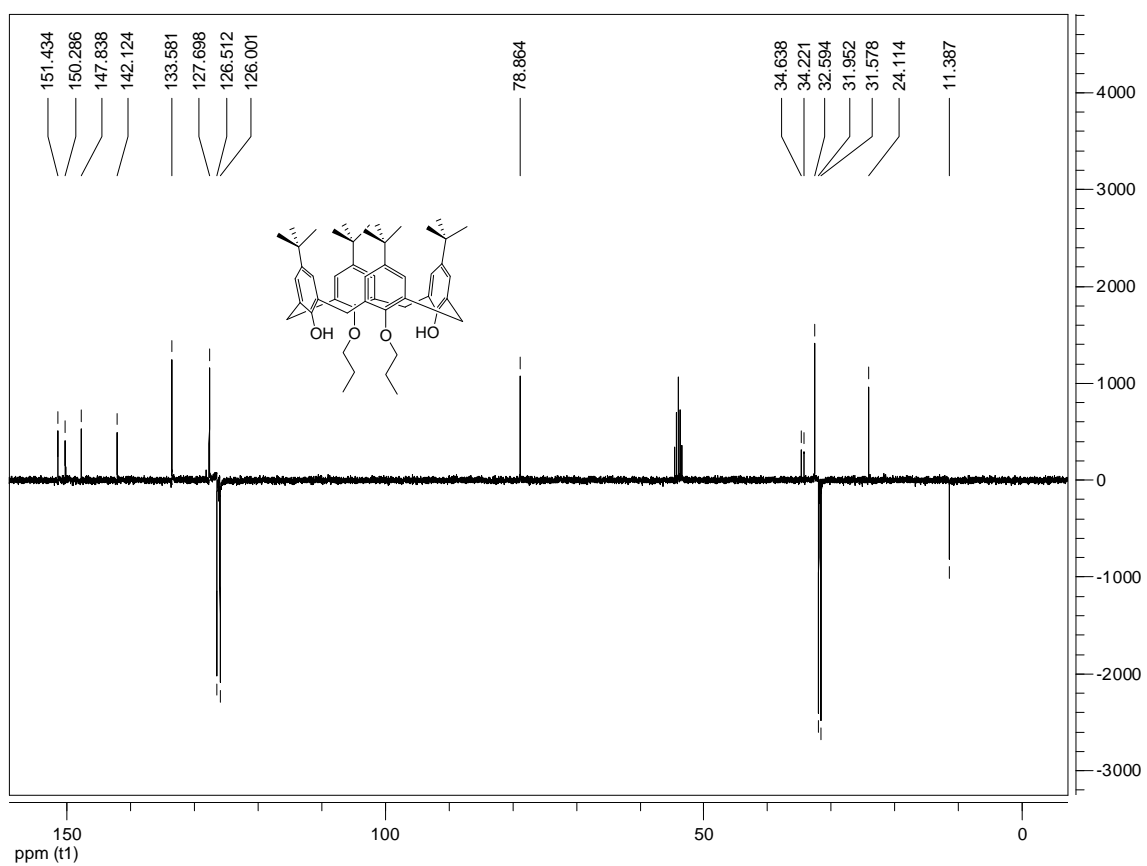


Figura 7.15. Espectro IR de (6).

Figura 7.16. Espectro HRMS (ESI<sup>+</sup>) de (6).

Figura 7.17. Espectro  $^1\text{H-RMN}$  de (7).Figura 7.18. Espectro  $^{13}\text{C-RMN}$  de (7).

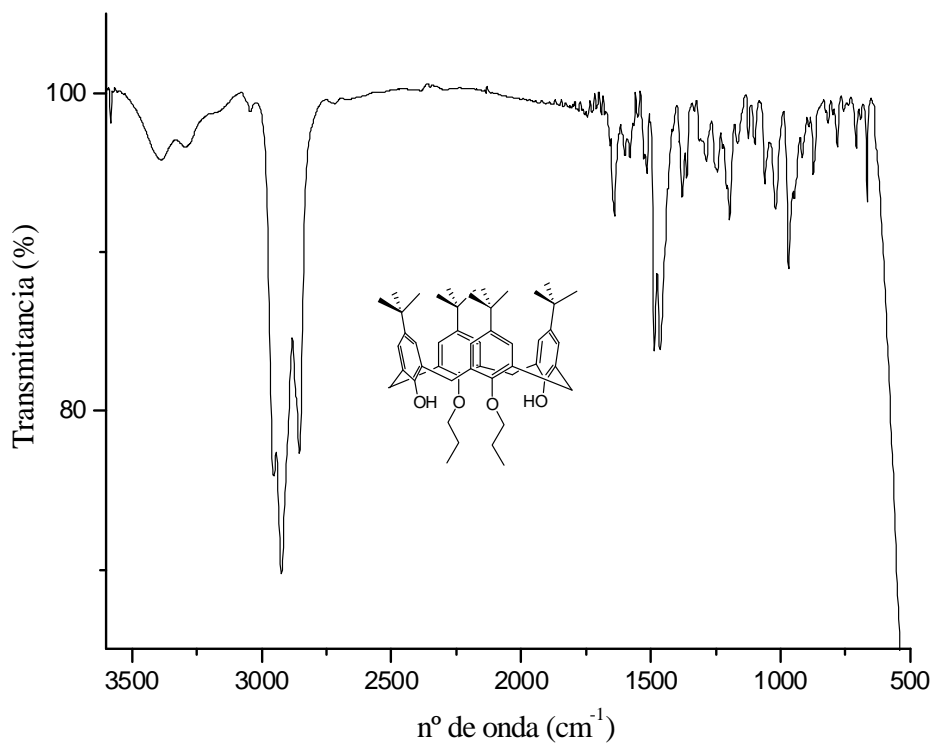
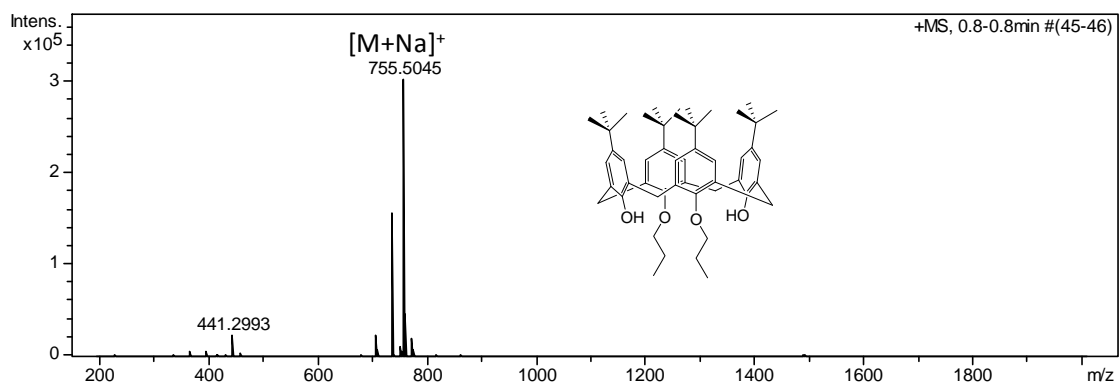
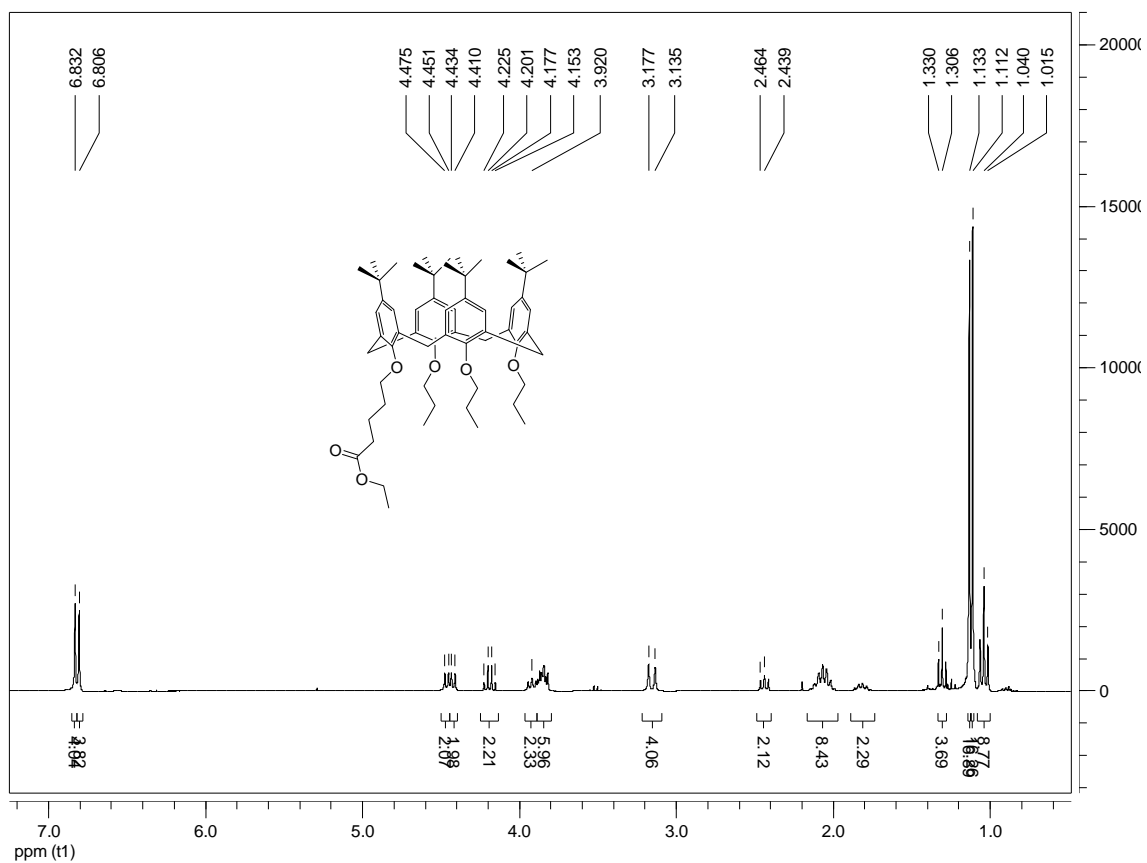
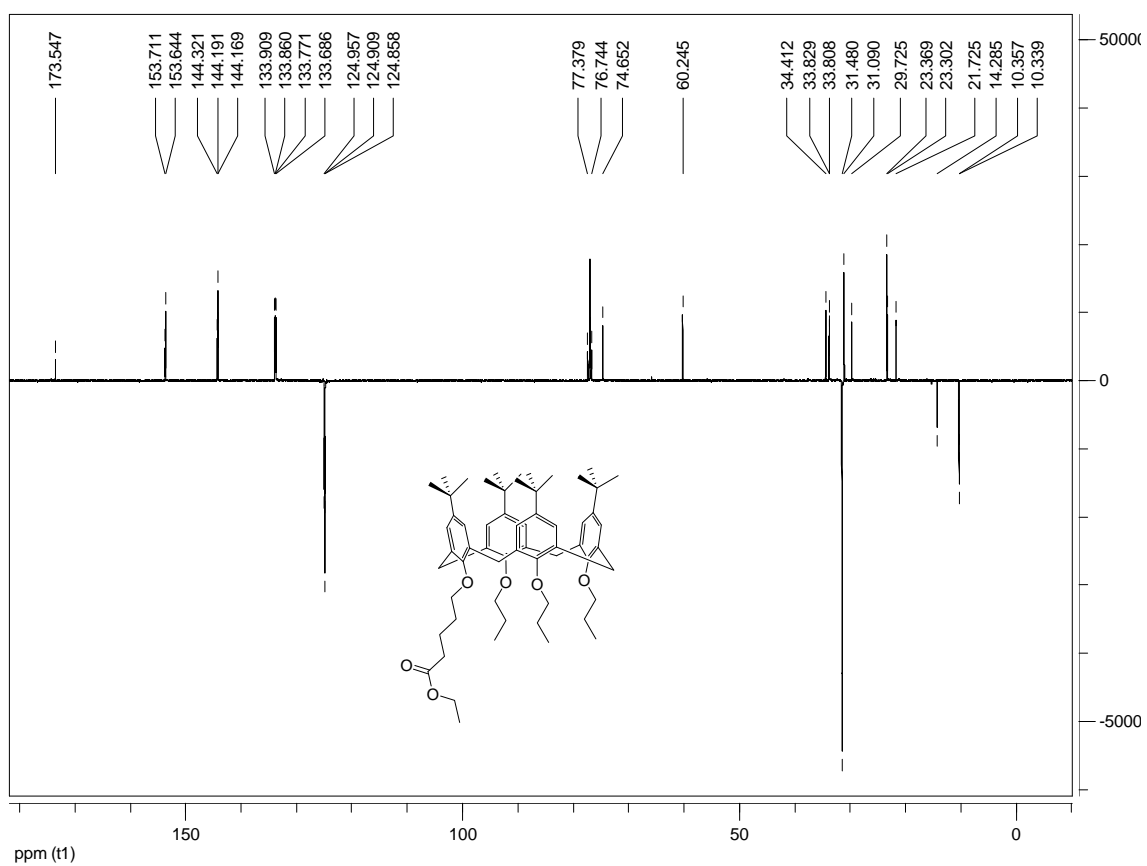


Figura 7.19. Espectro IR de (7).

Figura 7.20. Espectro HRMS (ESI<sup>+</sup>) de (7).

Figura 7.21. Espectro  $^1\text{H-RMN}$  de (8).Figura 7.22. Espectro  $^{13}\text{C-RMN}$  de (8).

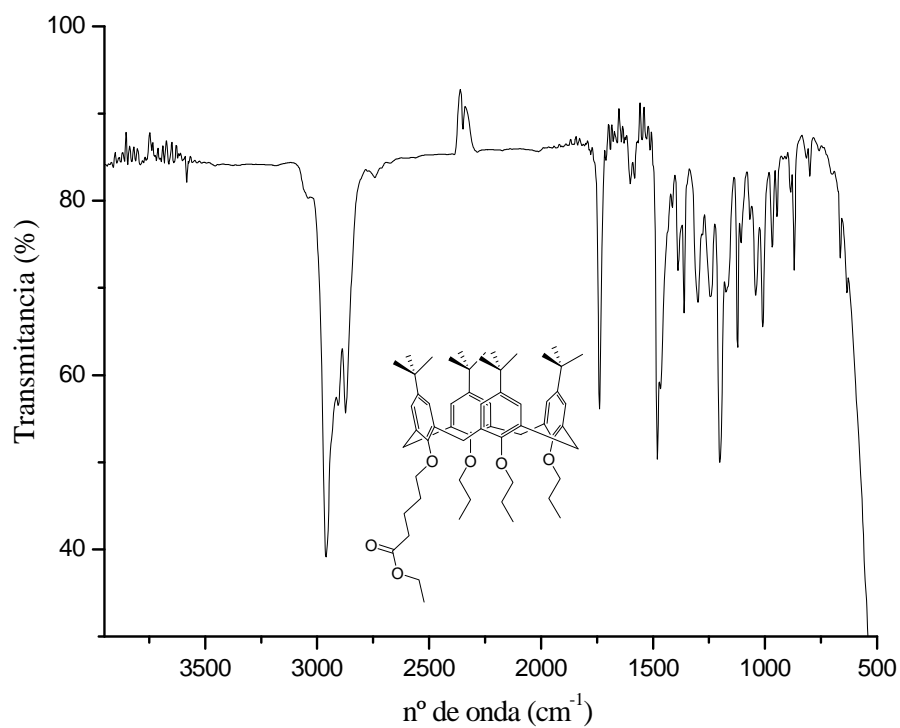
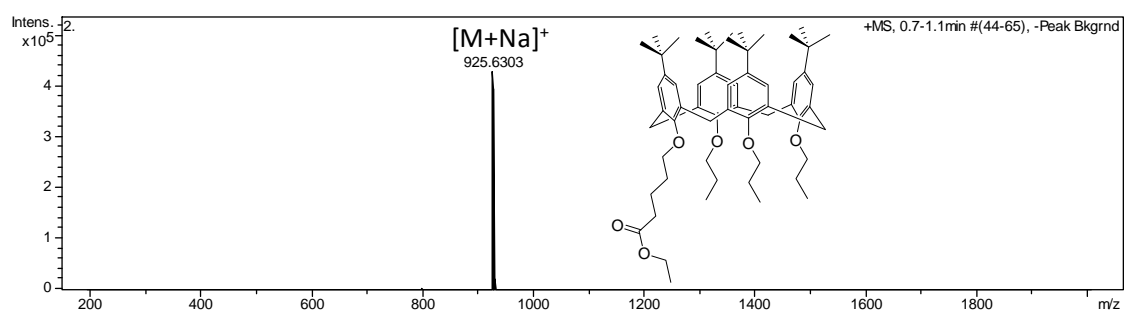
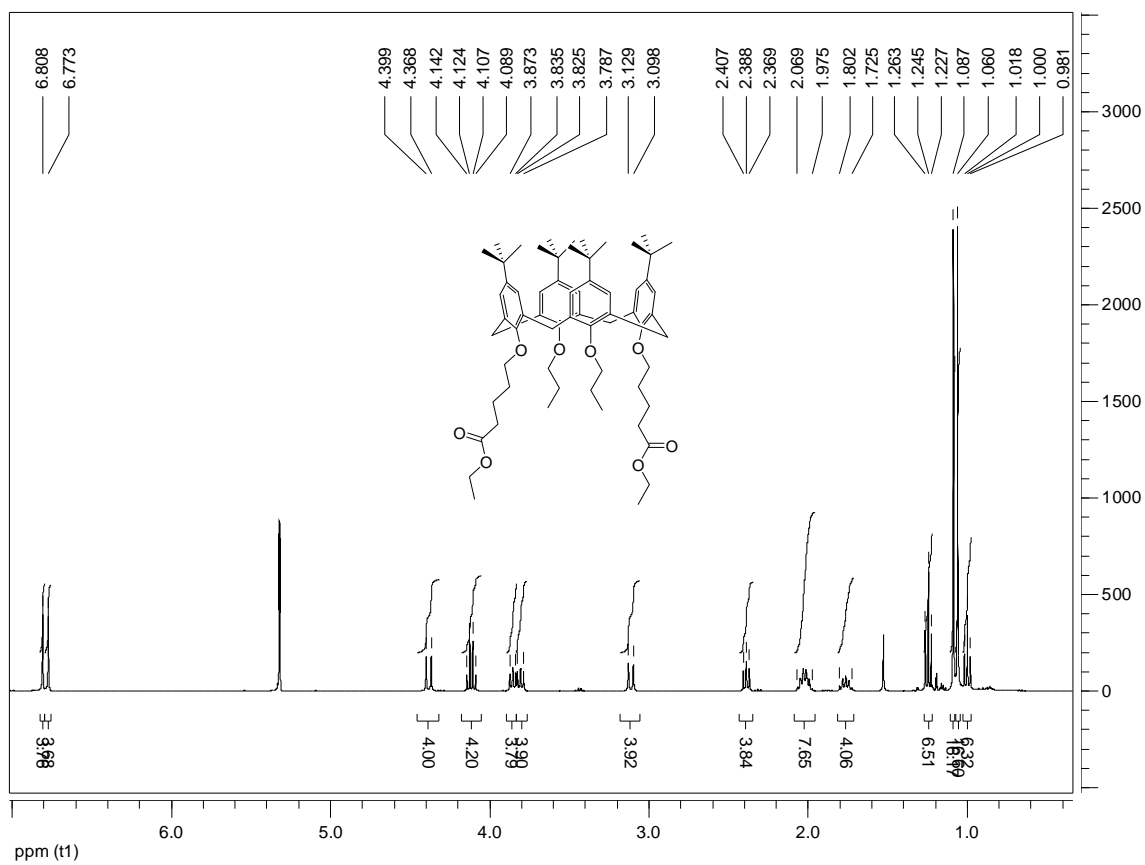
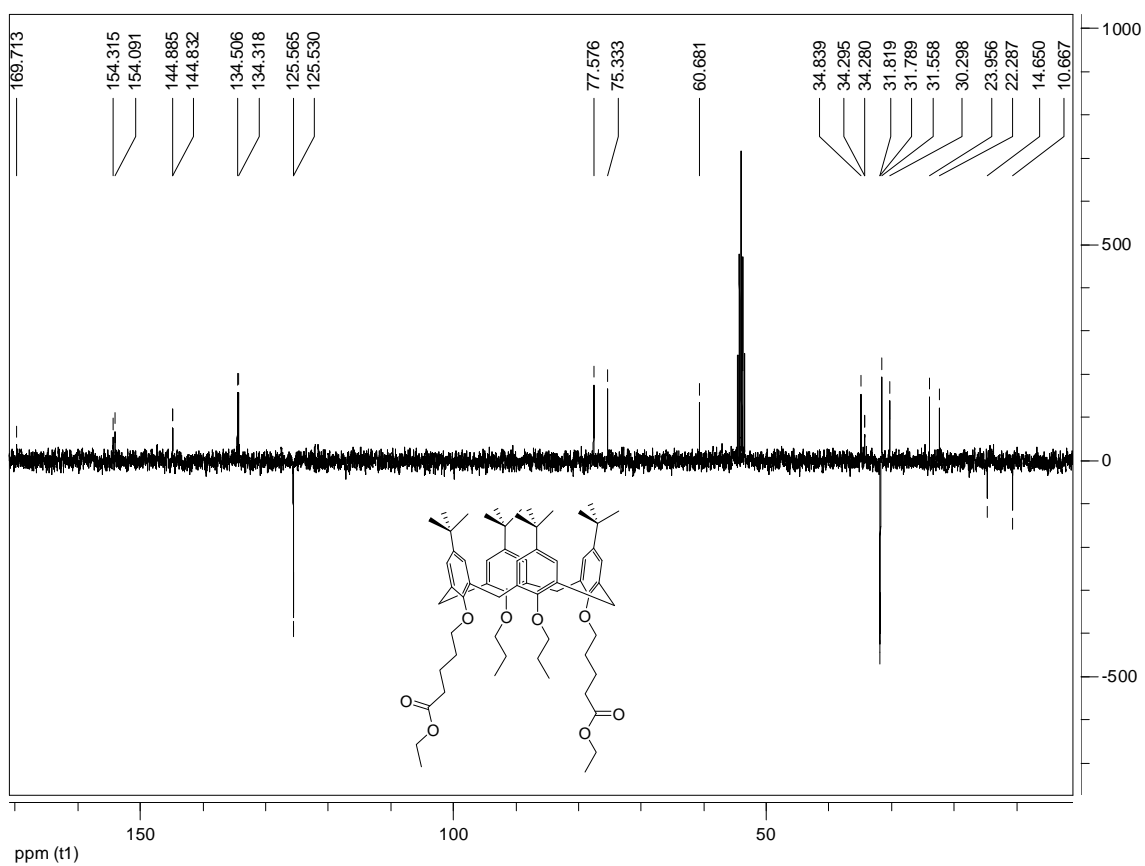


Figura 7.23. Espectro IR de (8).

Figura 7.24. Espectro HRMS (ESI<sup>+</sup>) de (8).



Figura 7.25. Espectro  $^1\text{H-RMN}$  de (9).Figura 7.26. Espectro  $^{13}\text{C-RMN}$  de (9).

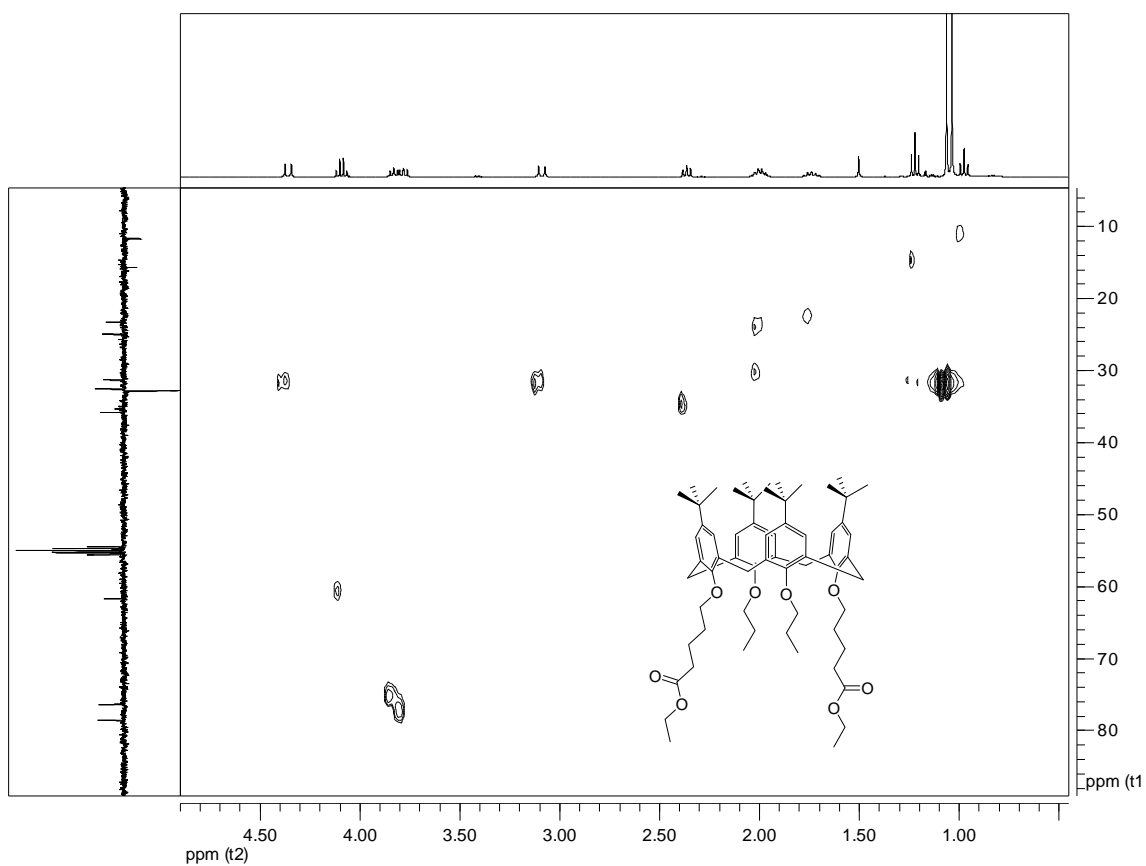


Figura 7.27. Espectro HSQC de (9).

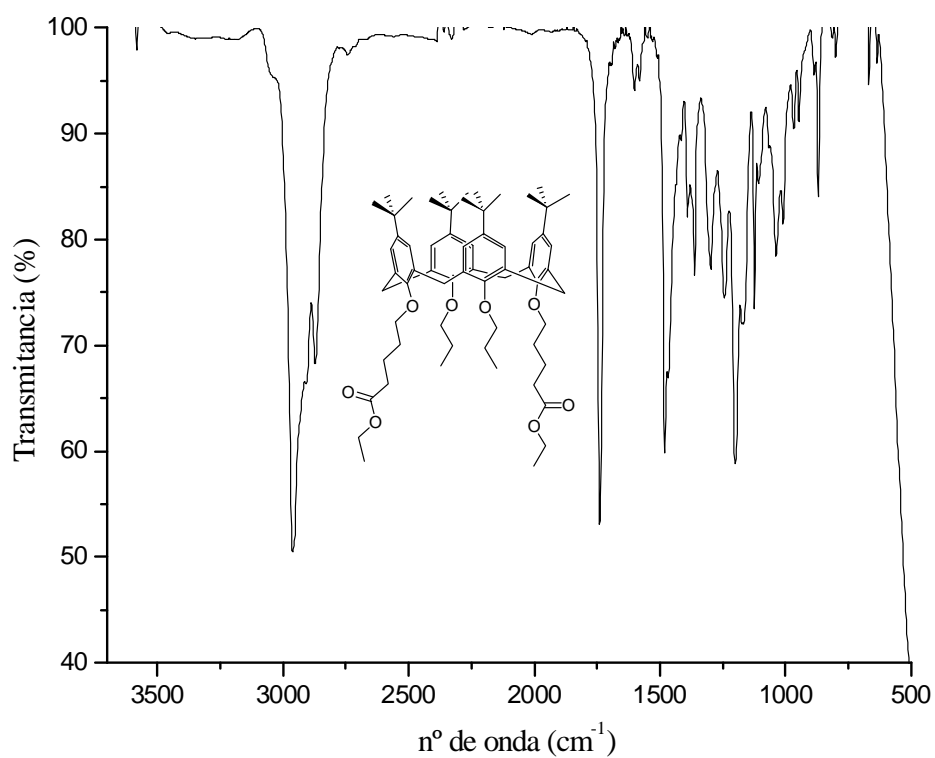


Figura 7.28. Espectro IR de (9).

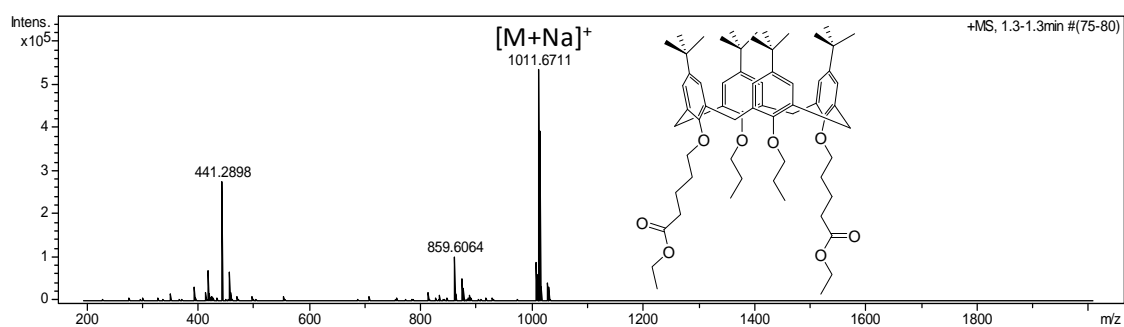


Figura 7.29. Espectro HRMS (ESI<sup>+</sup>) de (9).

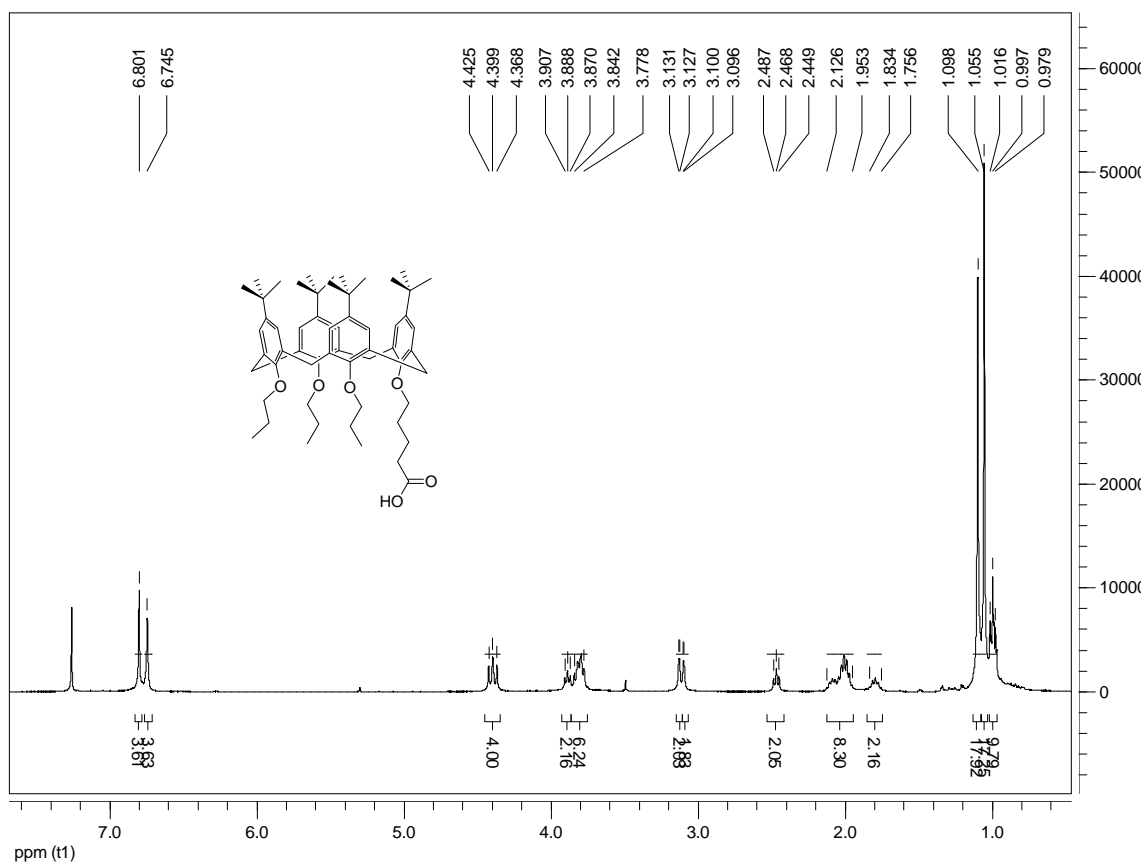
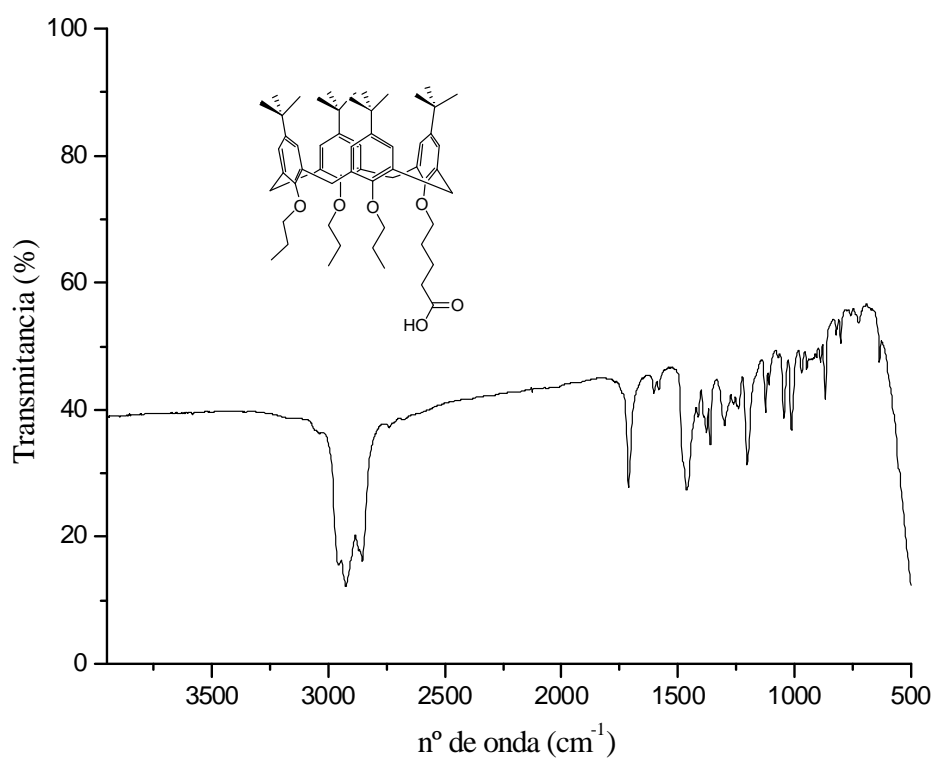
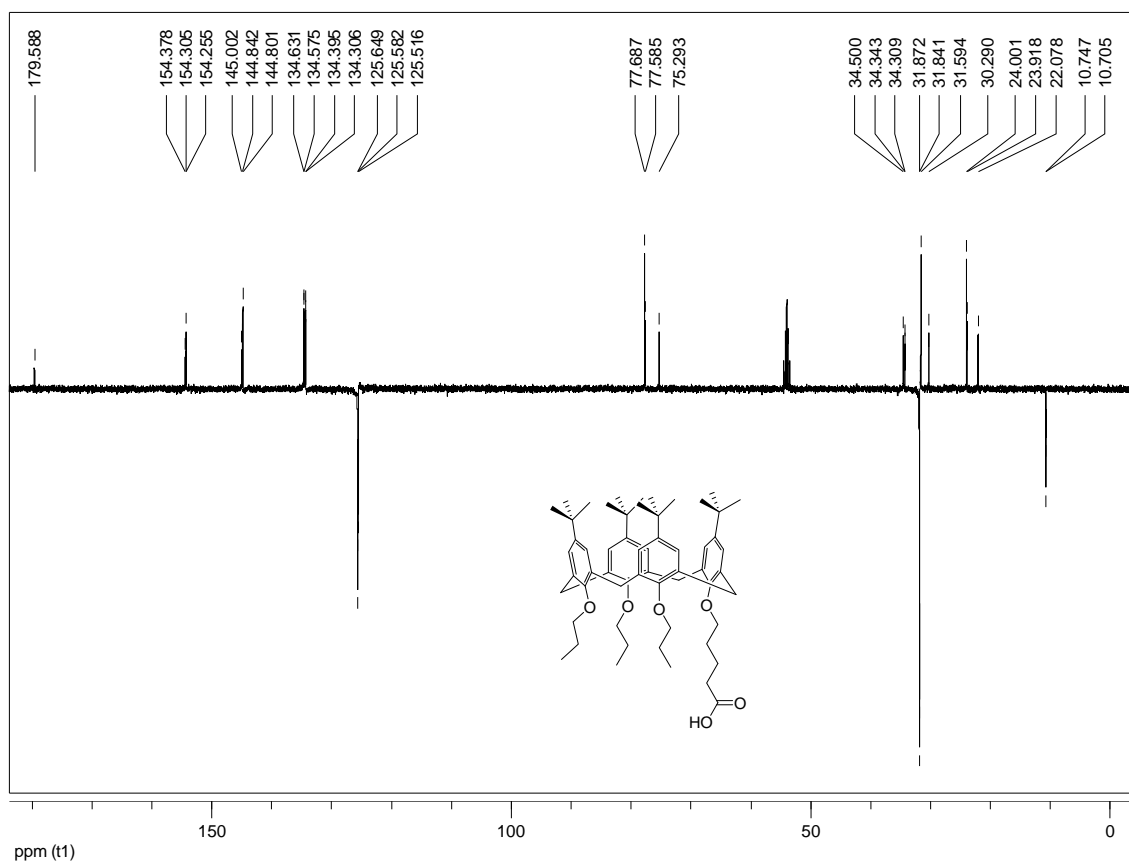


Figura 7.30. Espectro <sup>1</sup>H-RMN de (10).



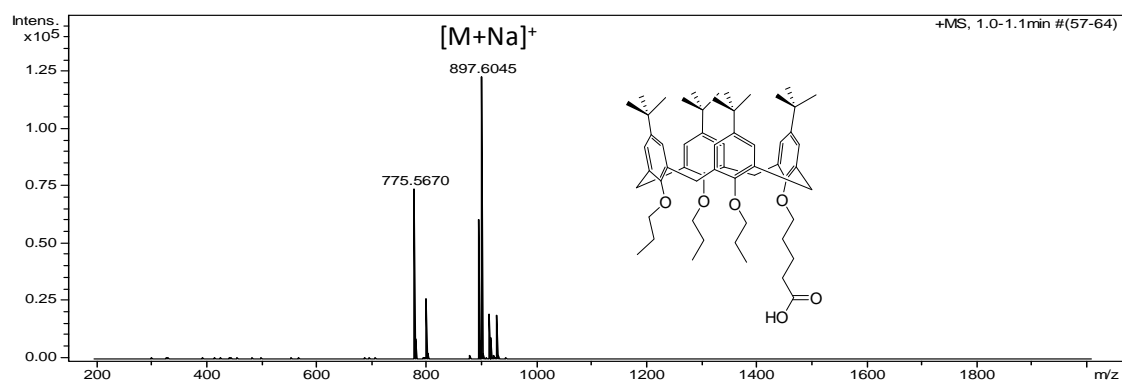


Figura 7.33. Espectro HRMS (ESI<sup>+</sup>) de (10).

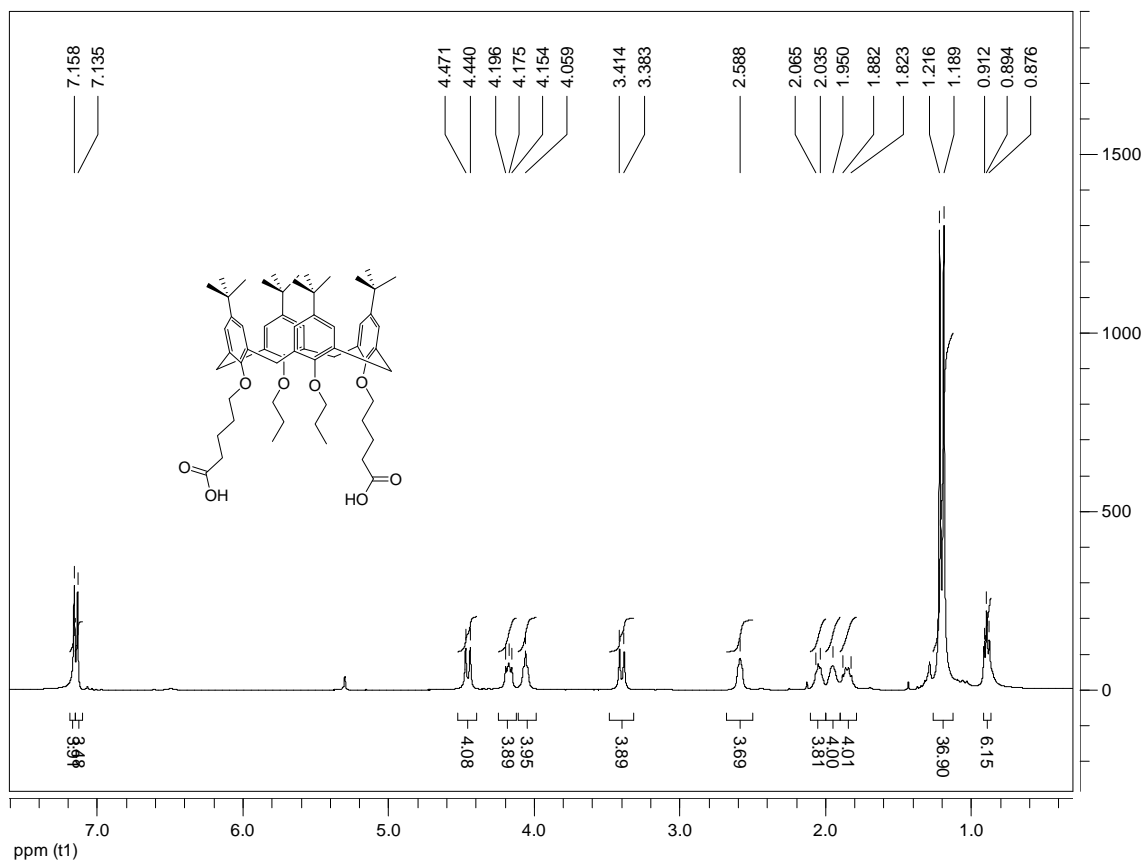


Figura 7.34. Espectro <sup>1</sup>H-RMN de (11).

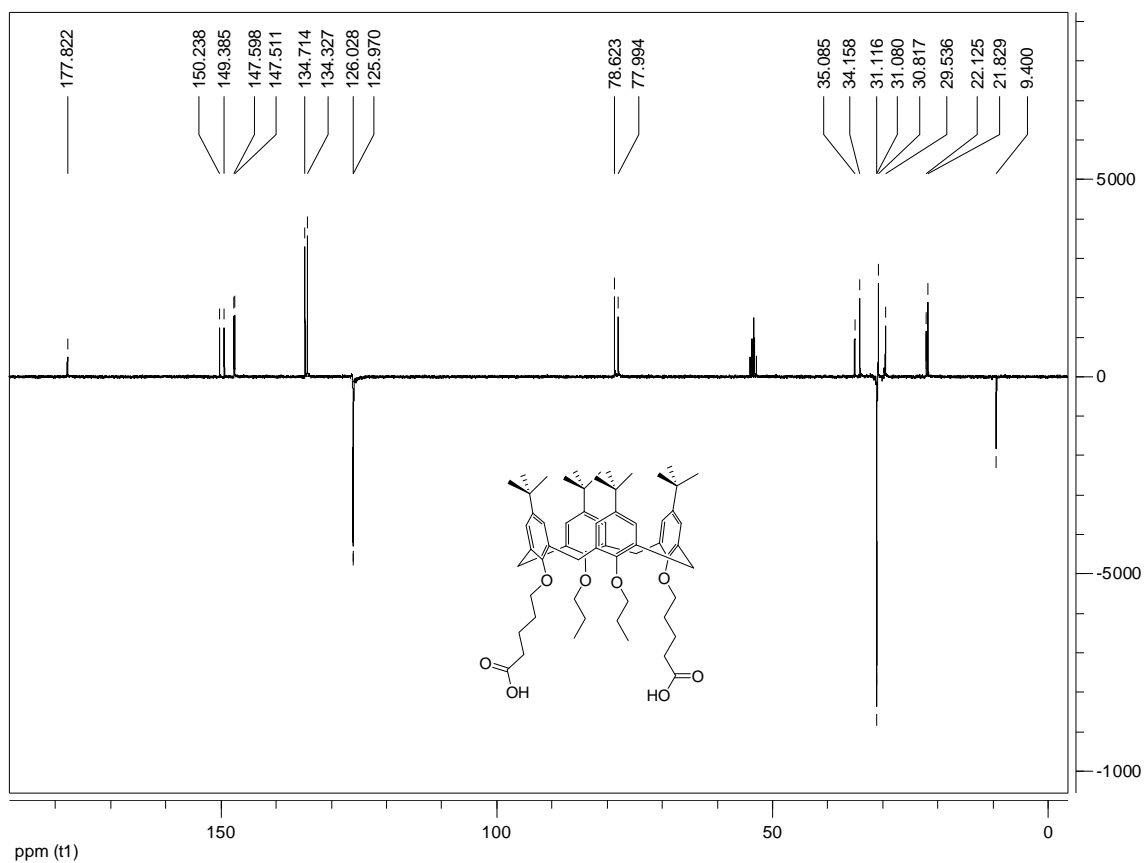


Figura 7.35. Espectro  $^{13}\text{C}$ -RMN de (11).

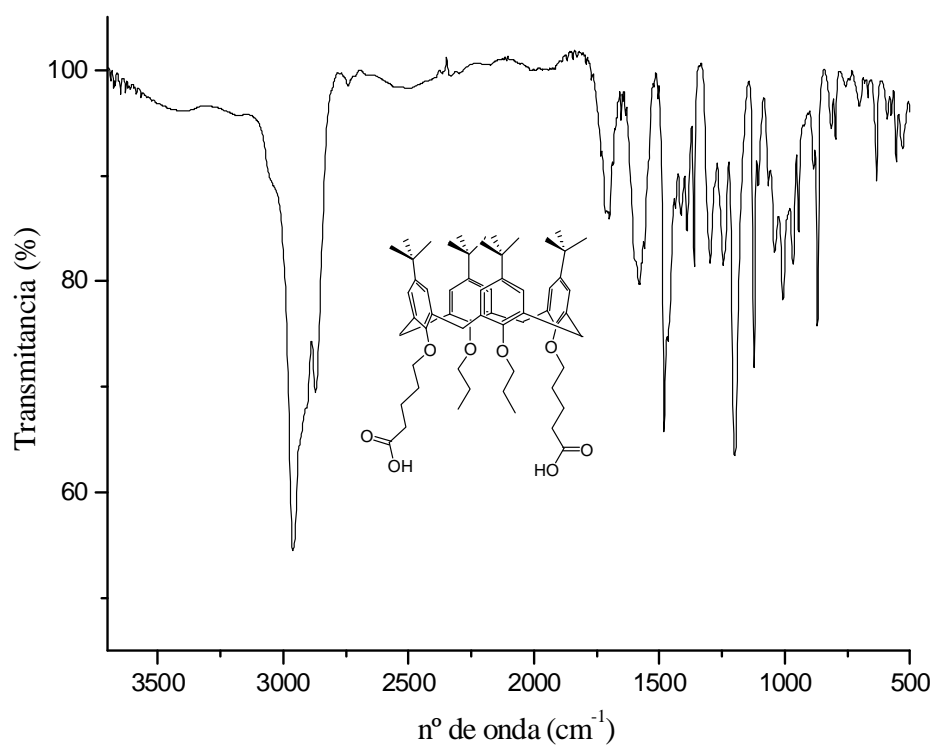
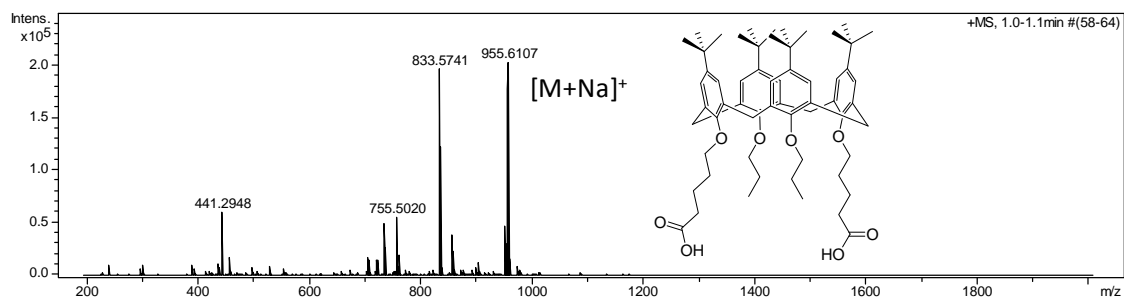
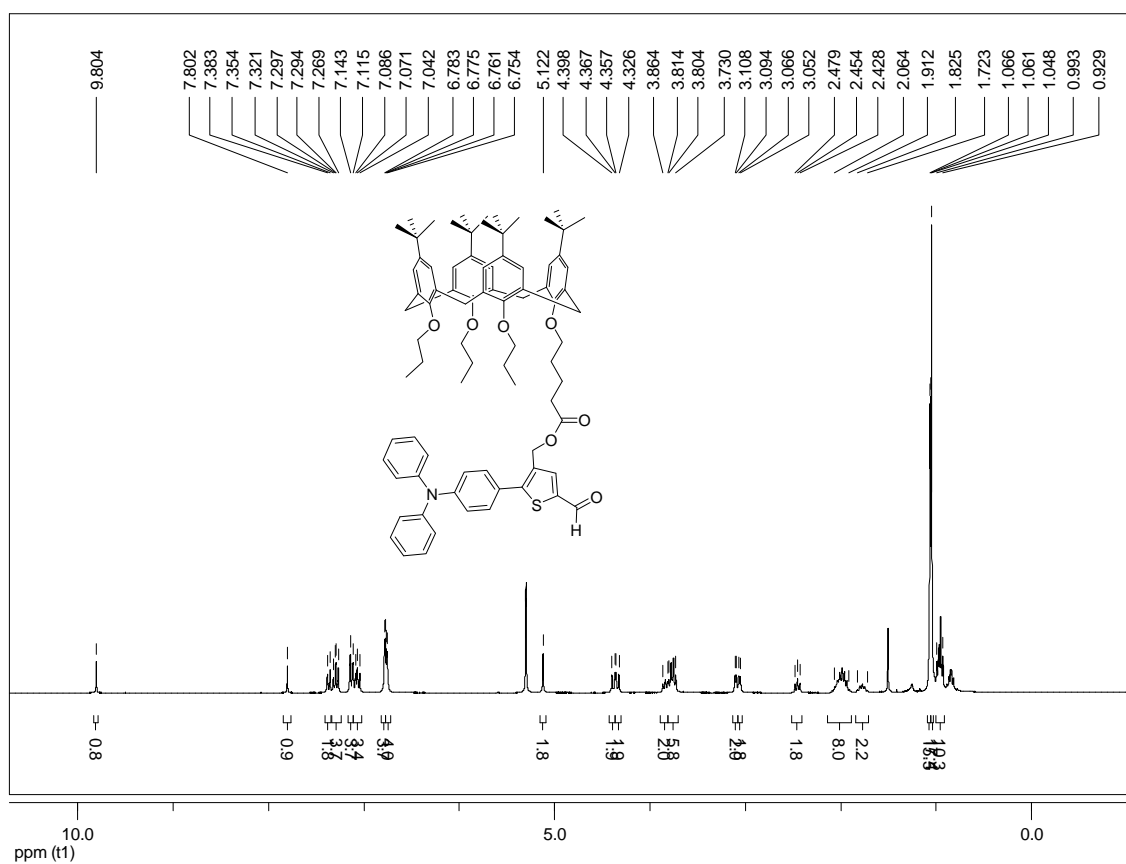


Figura 7.36. Espectro IR de (11).

Figura 7.37. Espectro HRMS (ESI<sup>+</sup>) de (11).Figura 7.38. Espectro <sup>1</sup>H-RMN de (12).

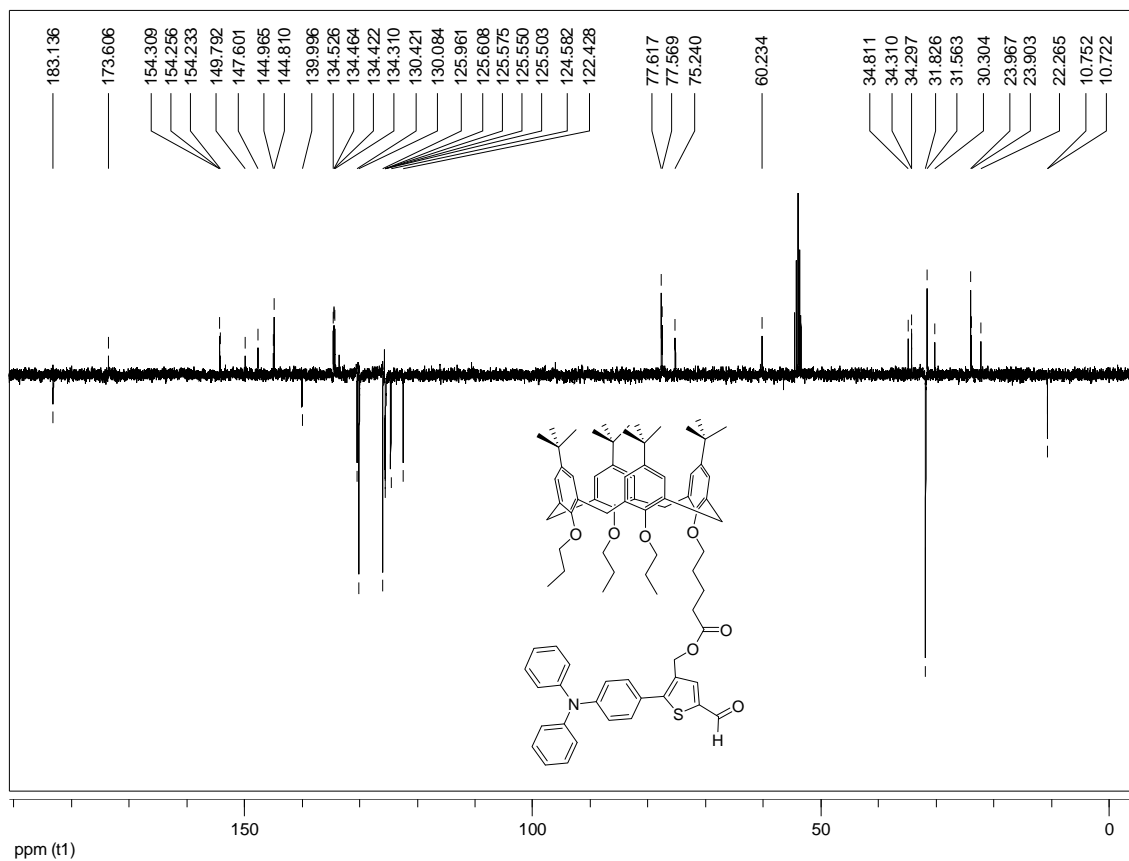


Figura 7.39. Espectro  $^{13}\text{C}$ -RMN de (12).

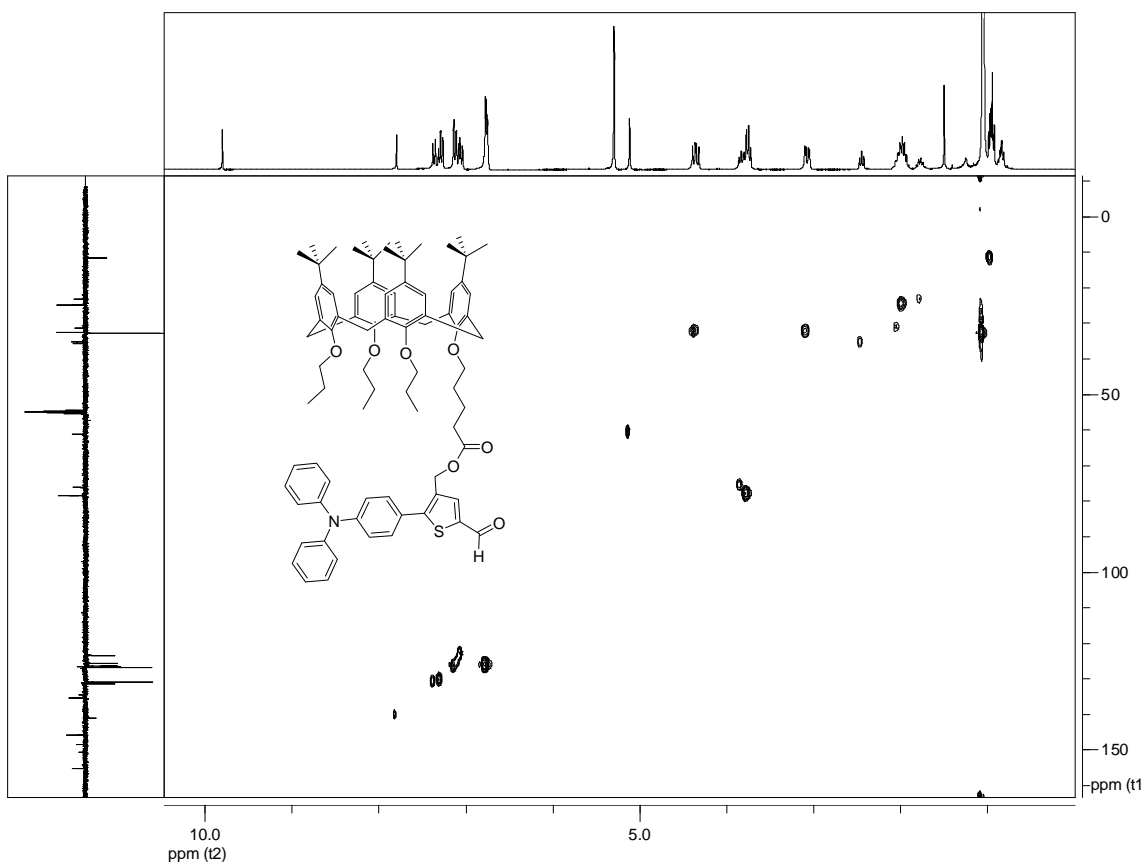


Figura 7.40. Espectro HSQC de (12).



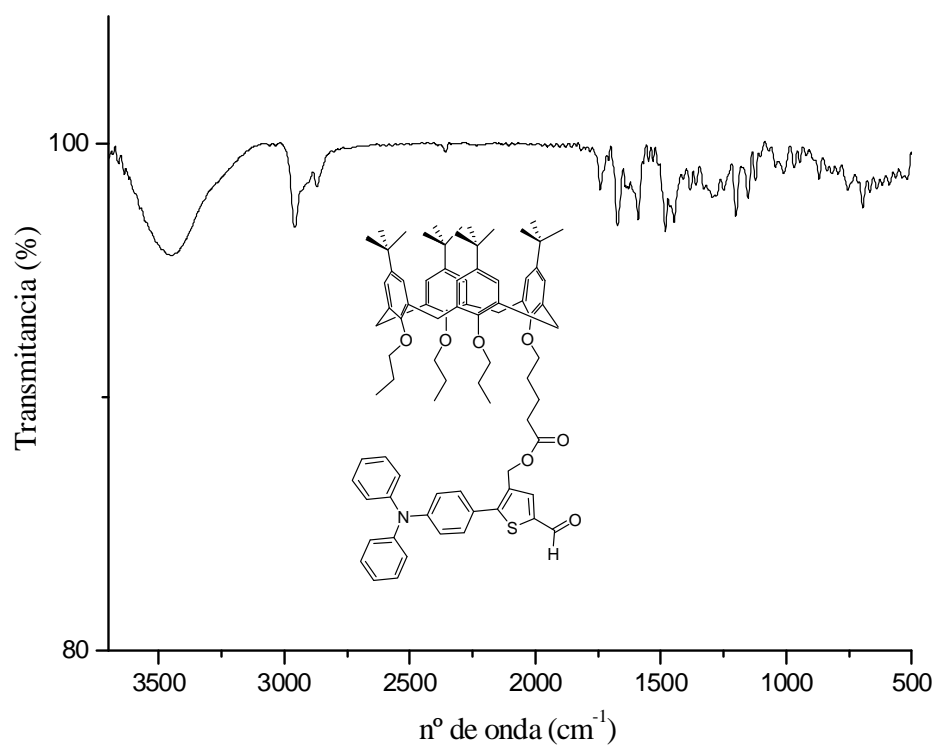
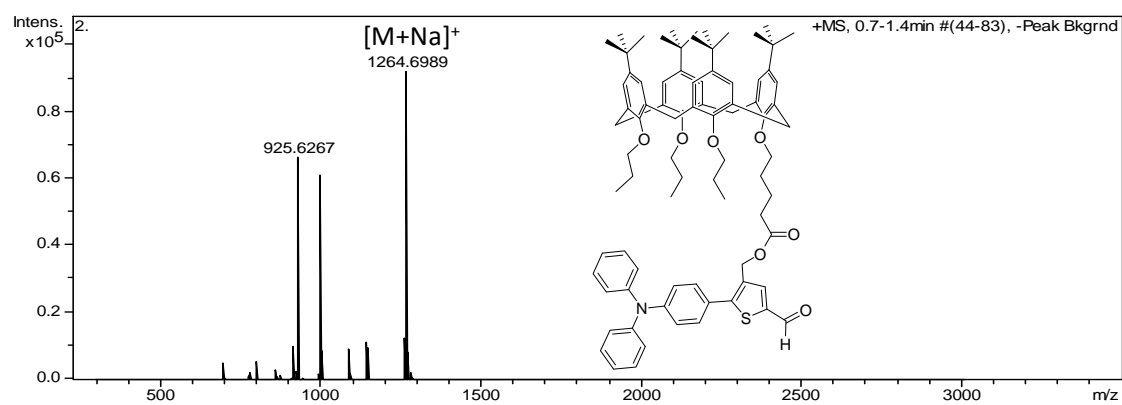


Figura 7.41. Espectro IR de (12).

Figura 7.42. Espectro HRMS (ESI<sup>+</sup>) de (12).

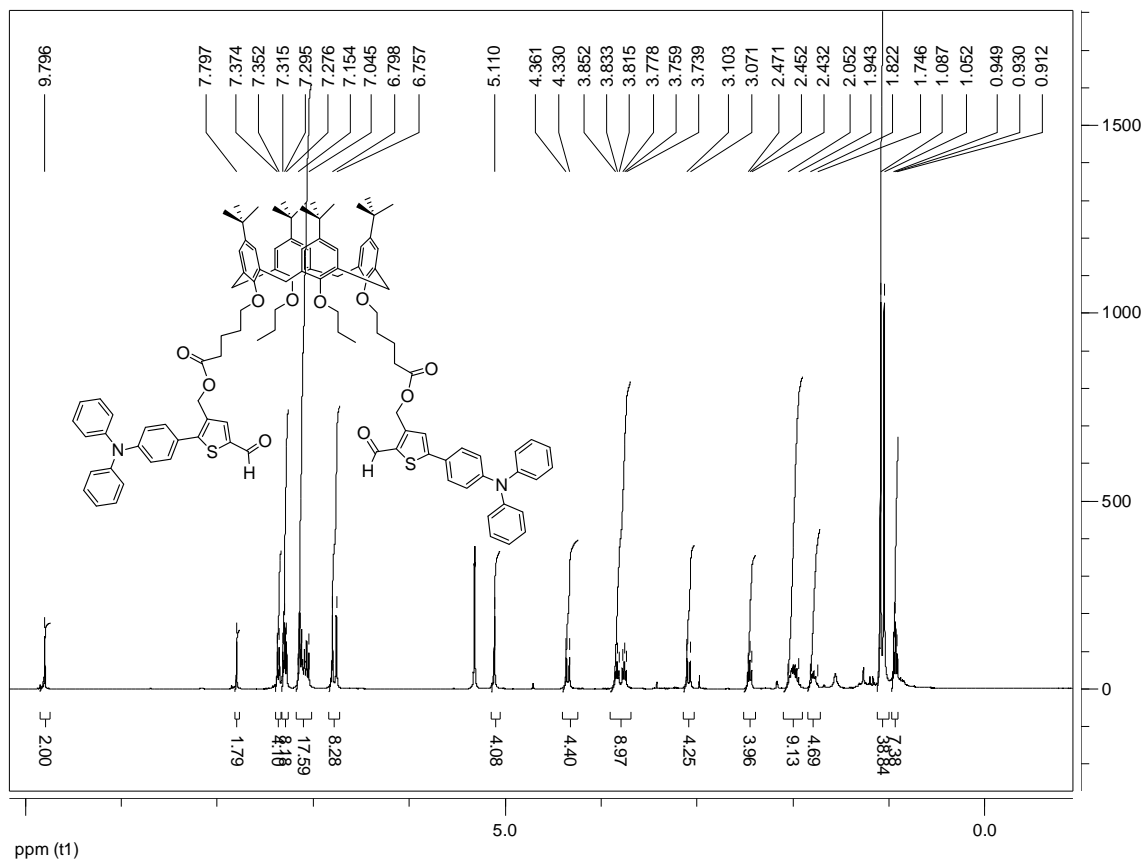


Figura 7.43. Espectro  $^1\text{H}$ -RMN de (13).

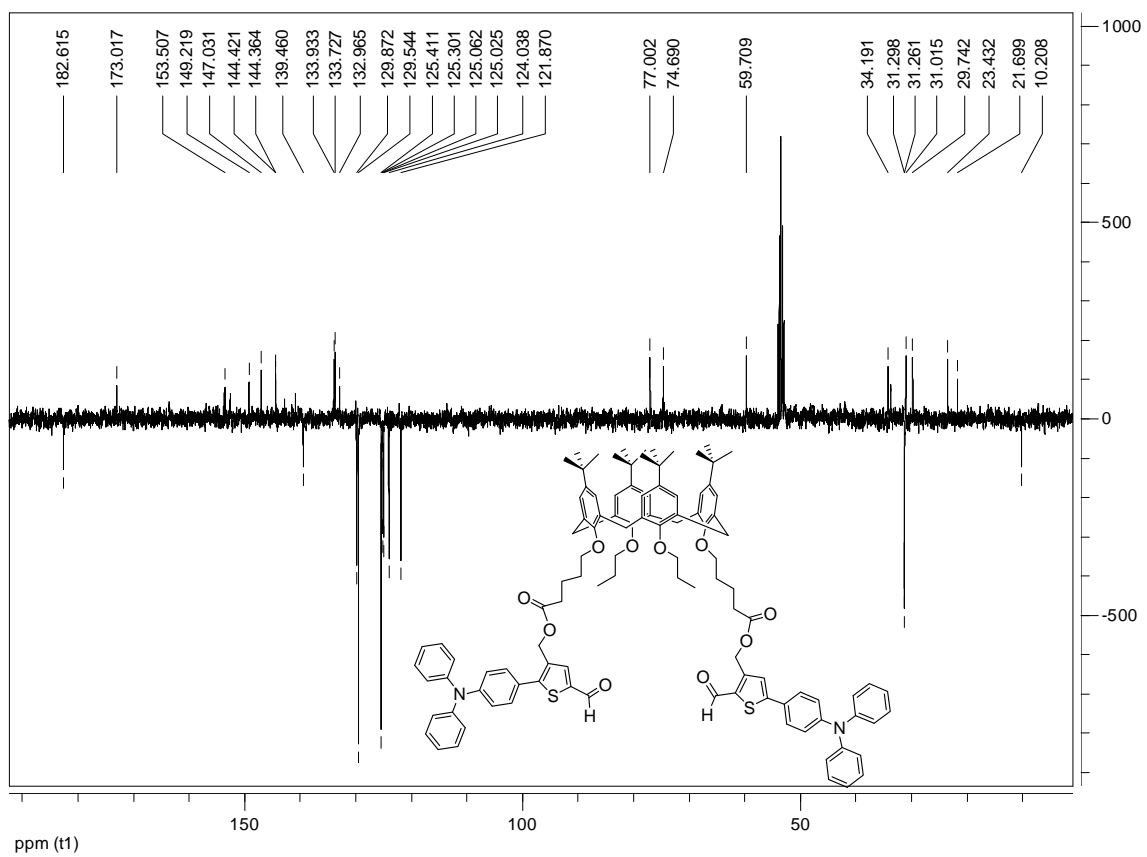


Figura 7.44. Espectro  $^{13}\text{C}$ -RMN de (13).

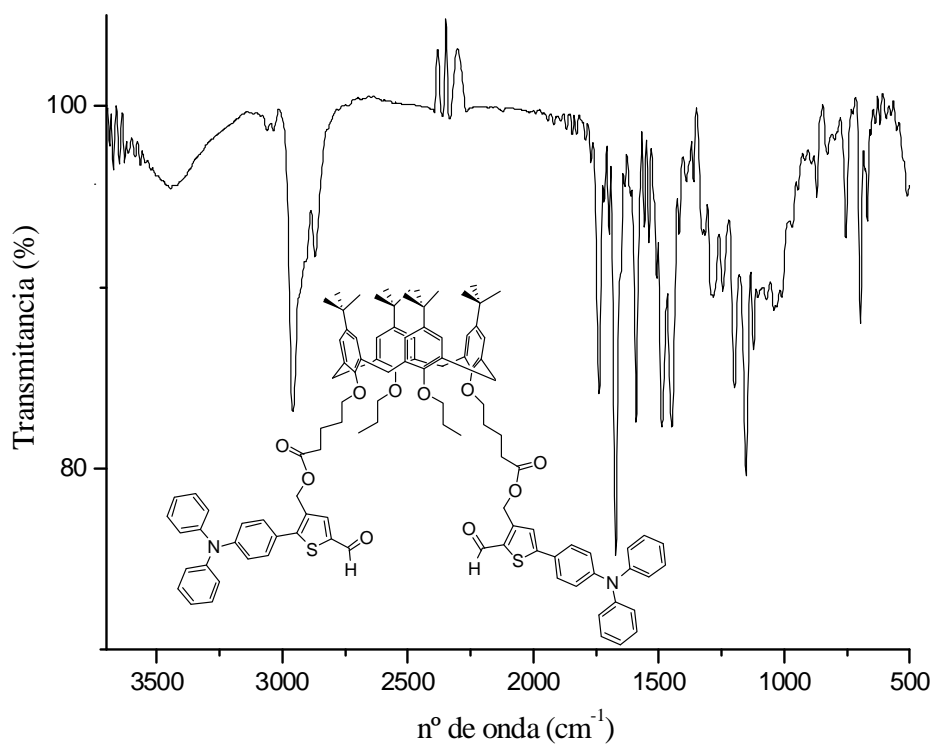
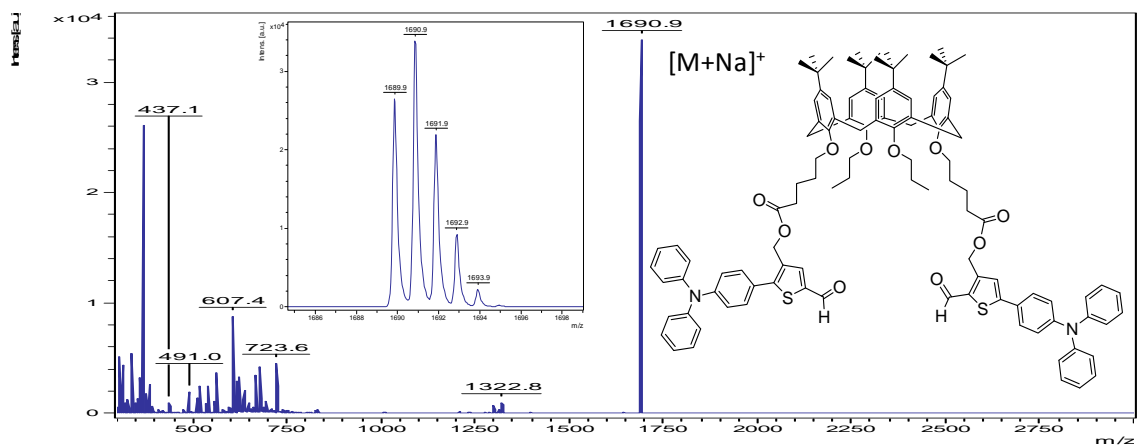


Figura 7.45. Espectro IR de (13)

Figura 7.46. Espectro HRMS (ESI<sup>+</sup>) de (13).

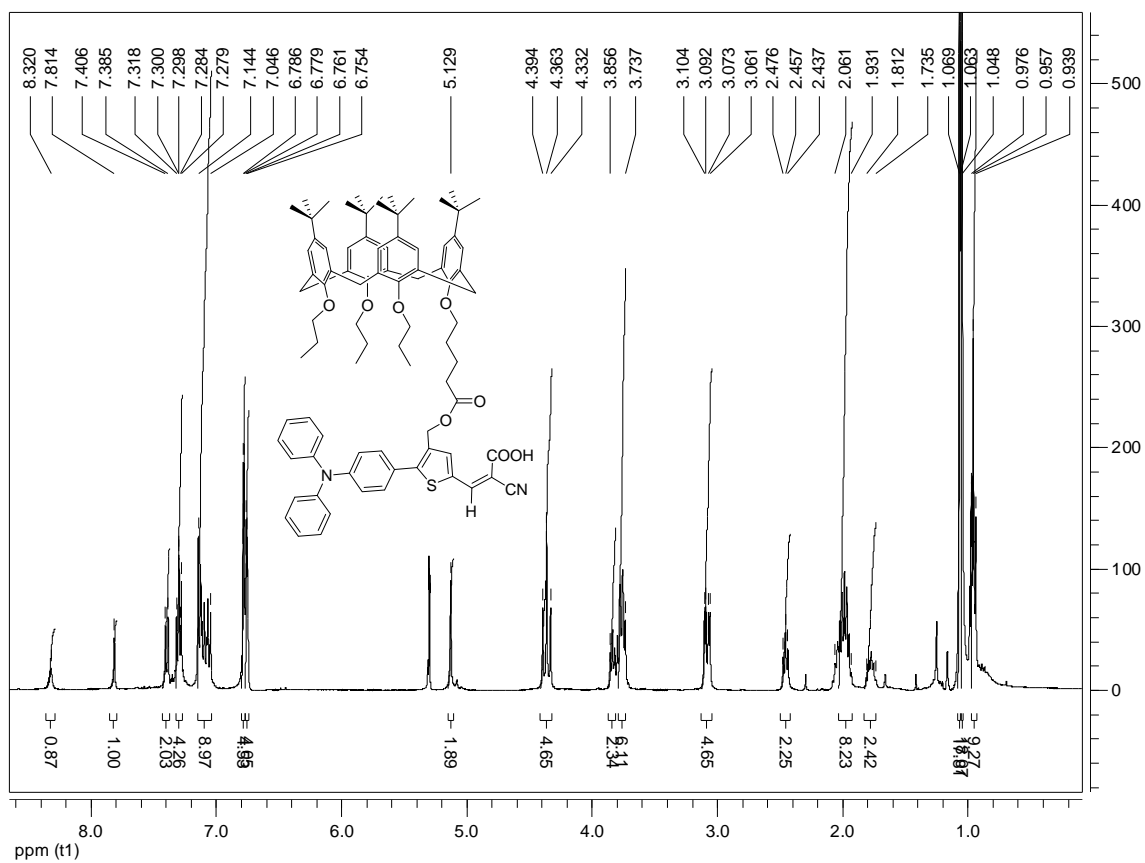


Figura 7.47. Espectro  $^1\text{H-RMN}$  de (14).

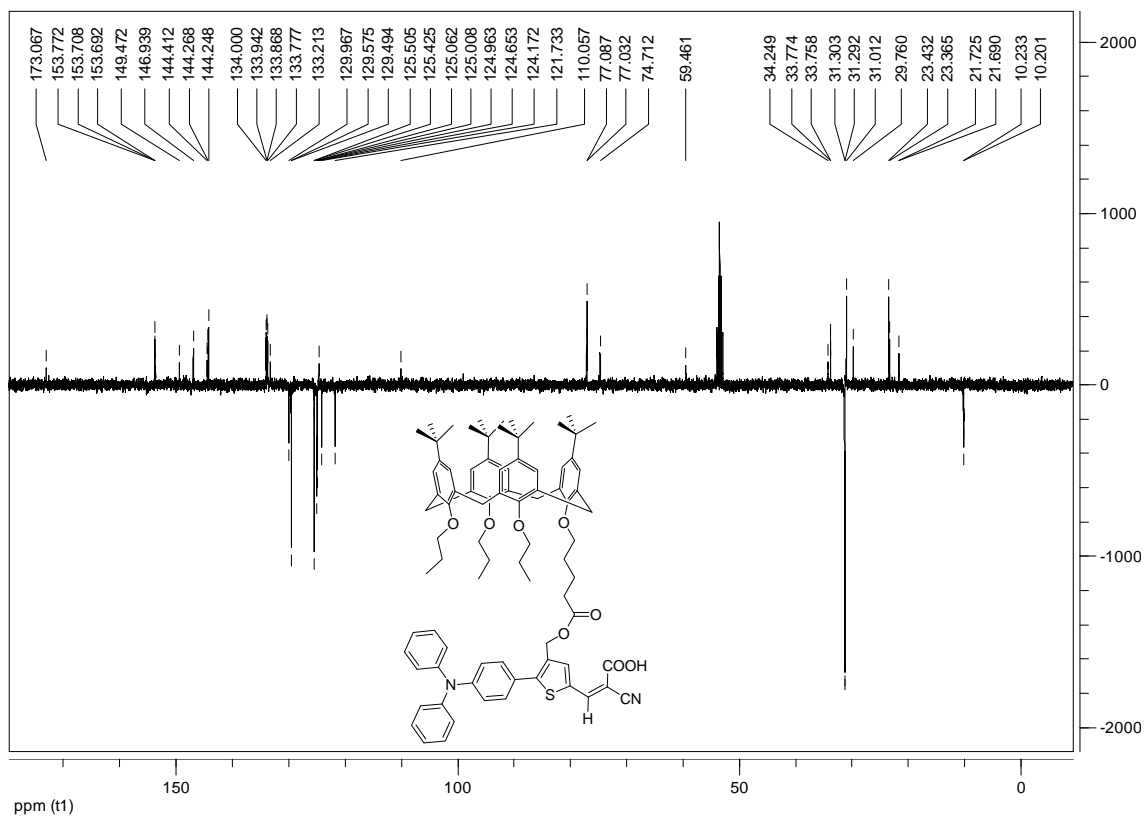


Figura 7.48. Espectro  $^{13}\text{C-RMN}$  de (14).

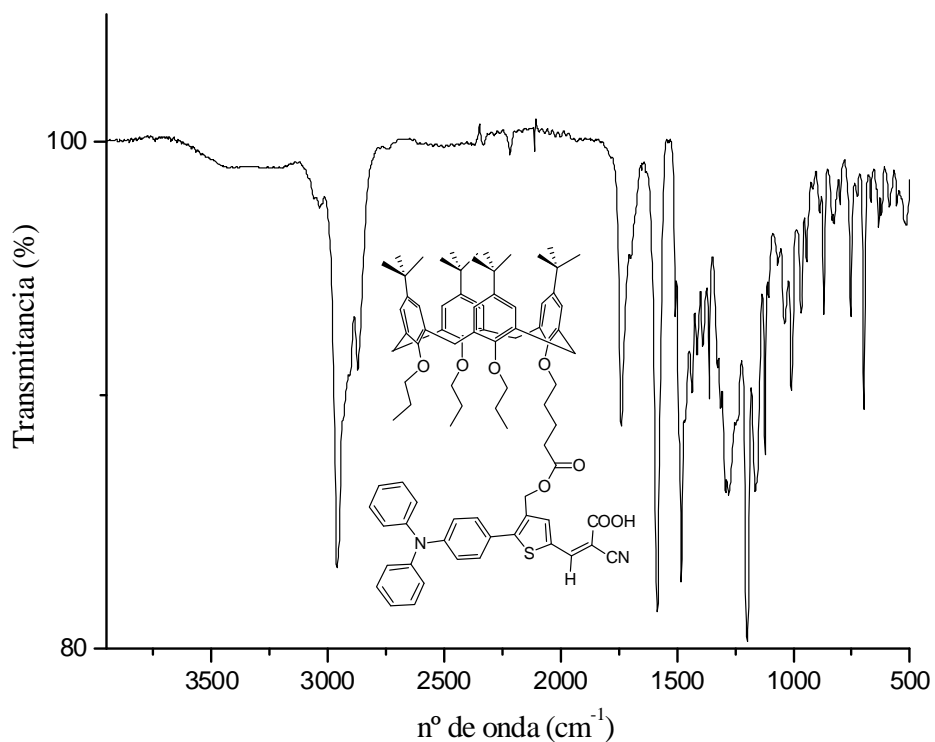
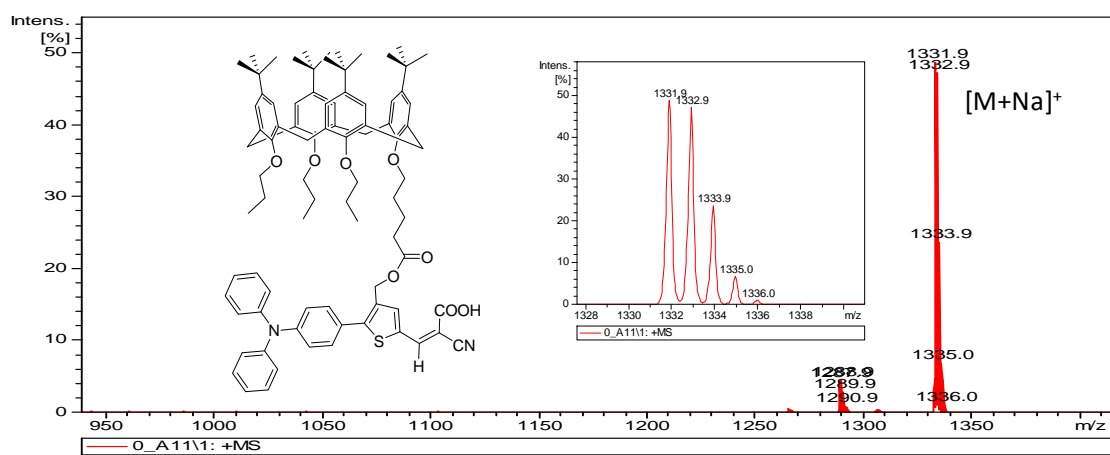


Figura 7.49. Espectro IR de (14).

Figura 7.50. Espectro LRMS (MALDI<sup>+</sup>) de (14).

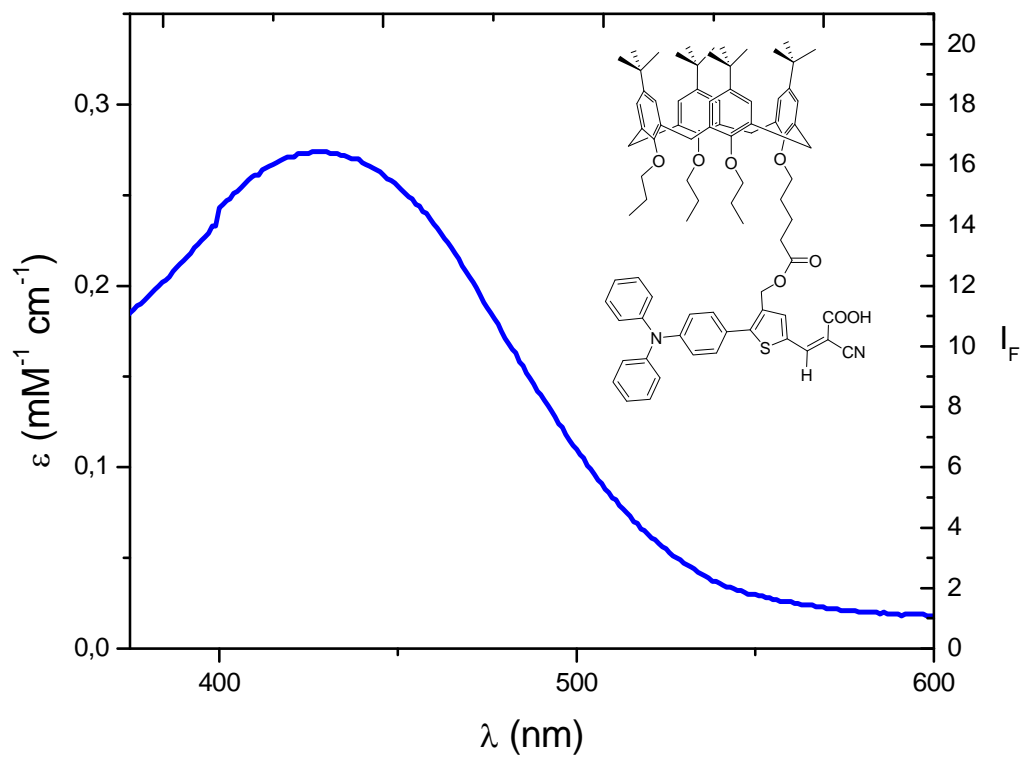


Figura 7.51. Espectro de absorción UV-visible de (14).

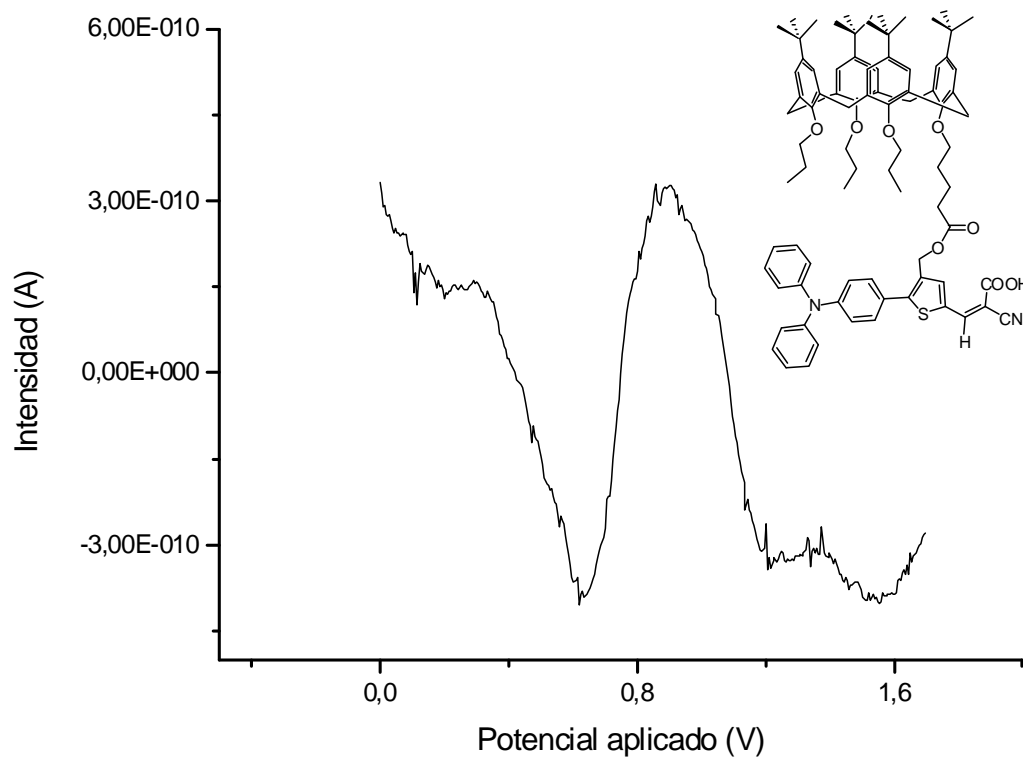


Figura 7.52. Voltamograma de pulso diferencial de (14).

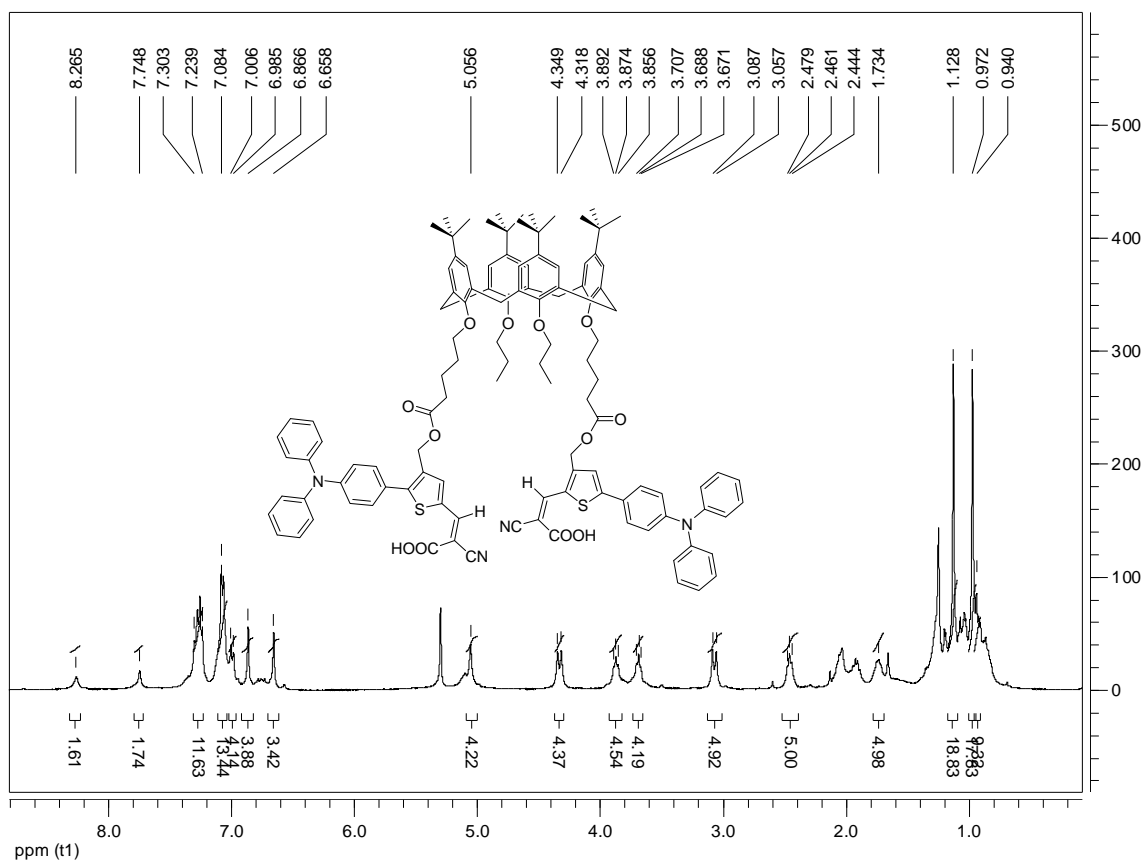


Figura 7.53. Espectro  $^1\text{H-RMN}$  de (15).

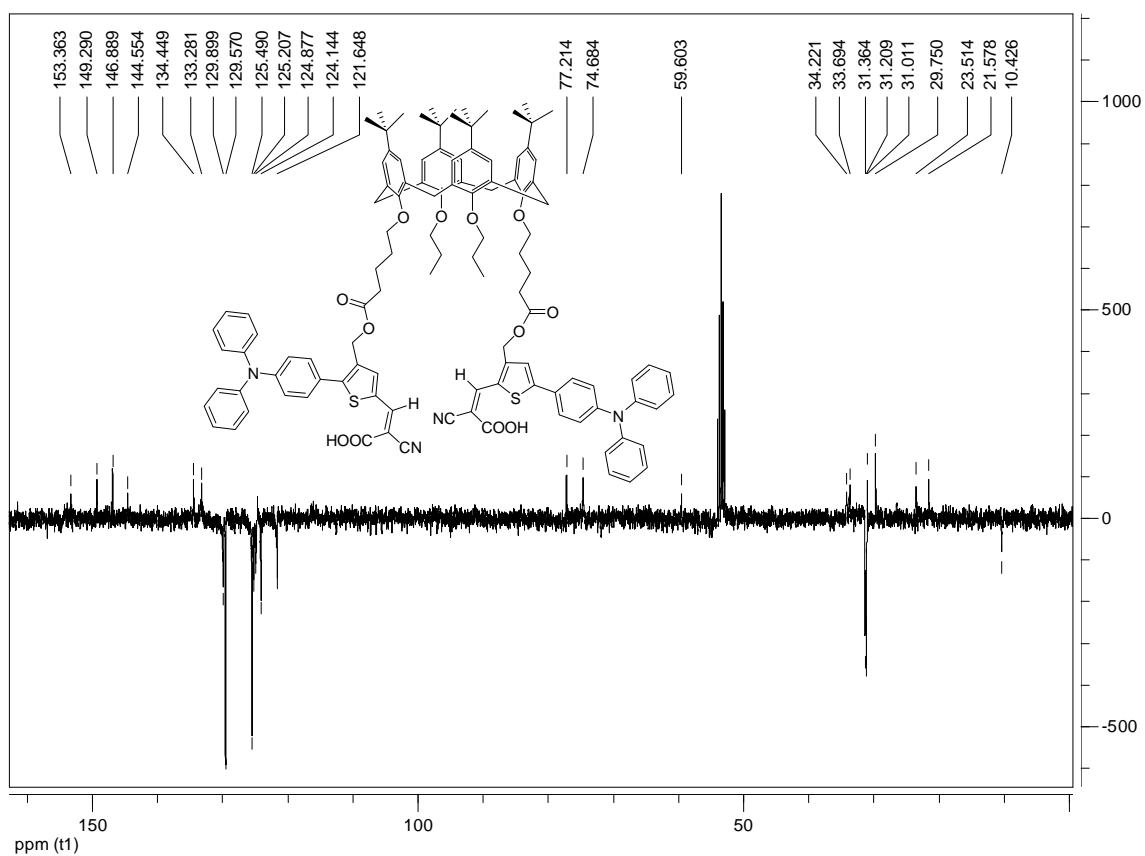


Figura 7.54. Espectro  $^{13}\text{C-RMN}$  de (15).

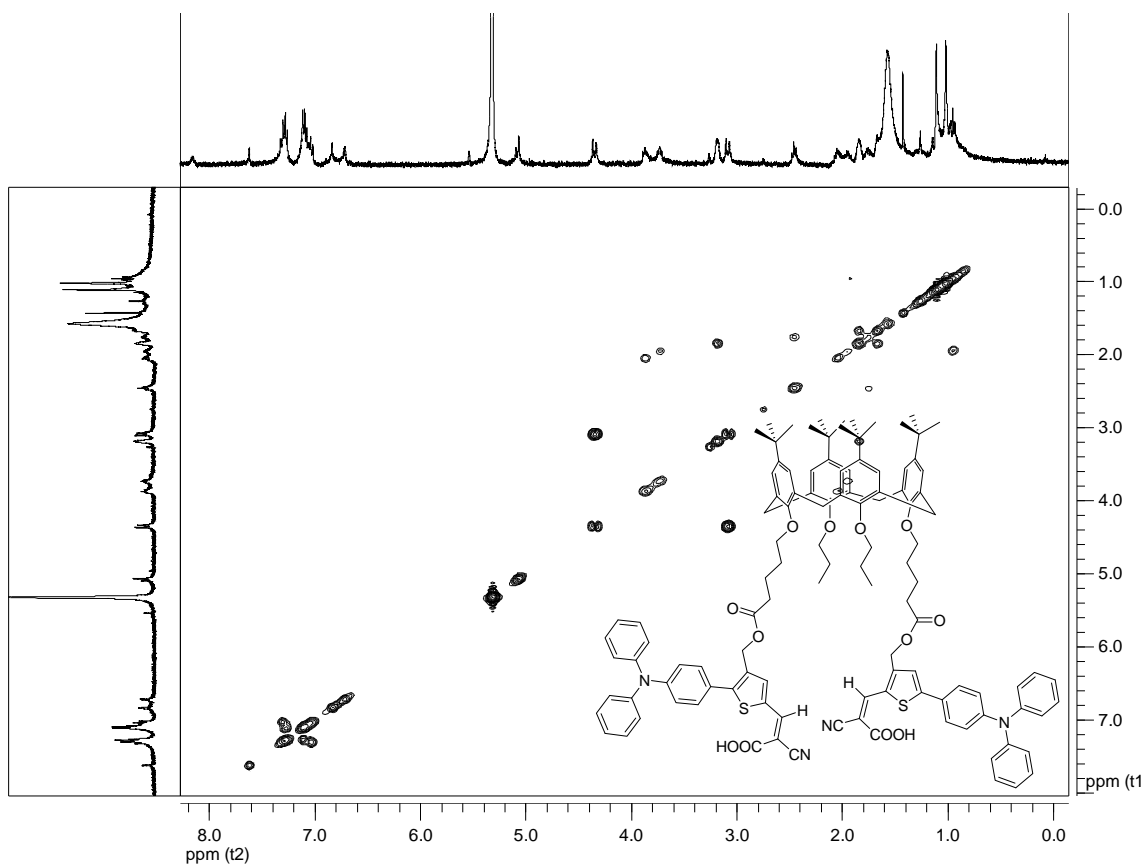


Figura 7.55. Espectro COSY de (15).

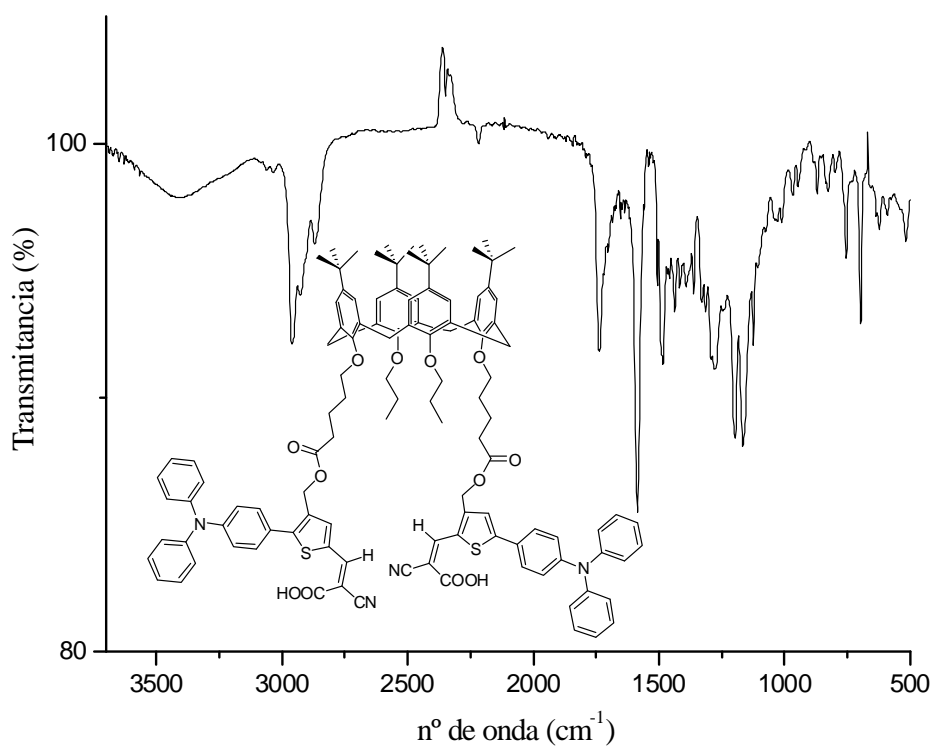


Figura 7.56. Espectro IR de (15).



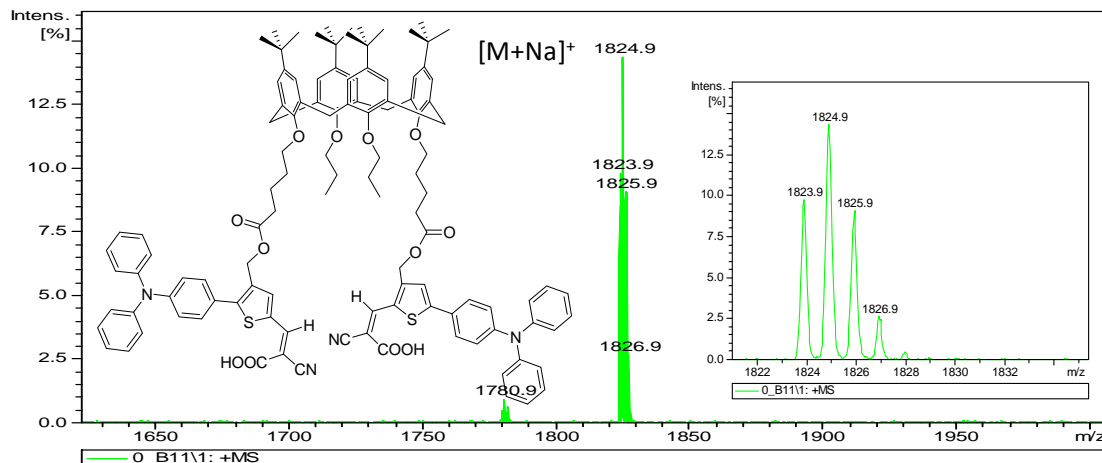
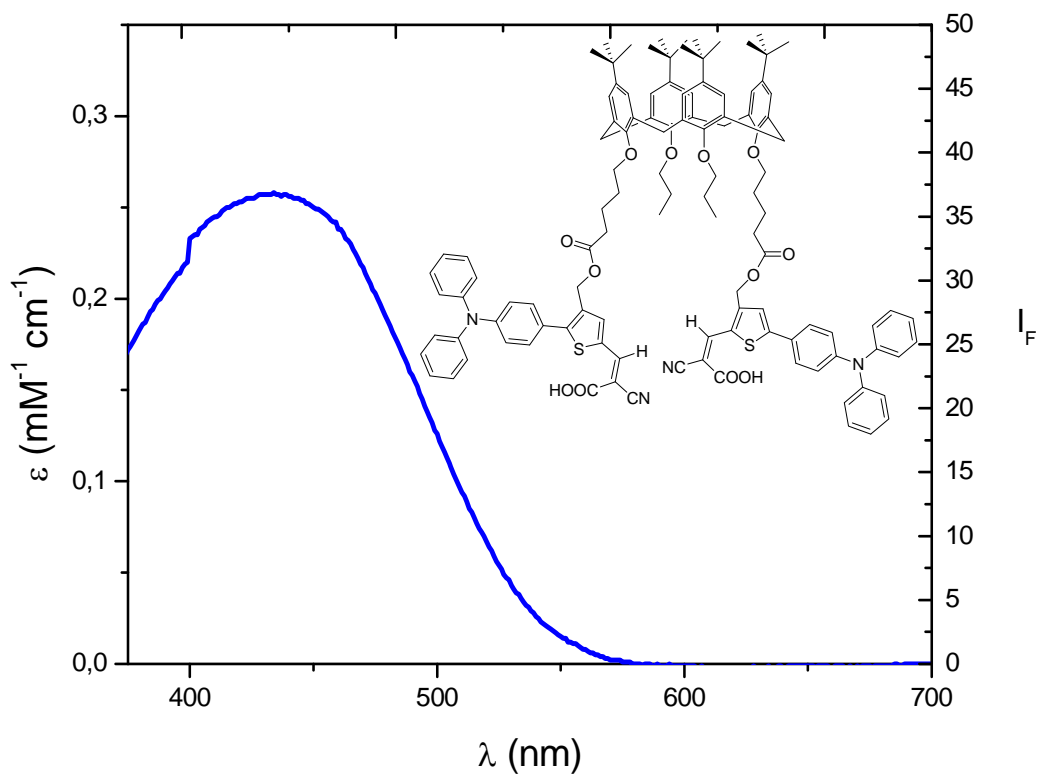
Figura 7.57. Espectro LRMS (MALDI<sup>+</sup>) de (15).

Figura 7.58. Espectro de absorción UV-visible de (15).

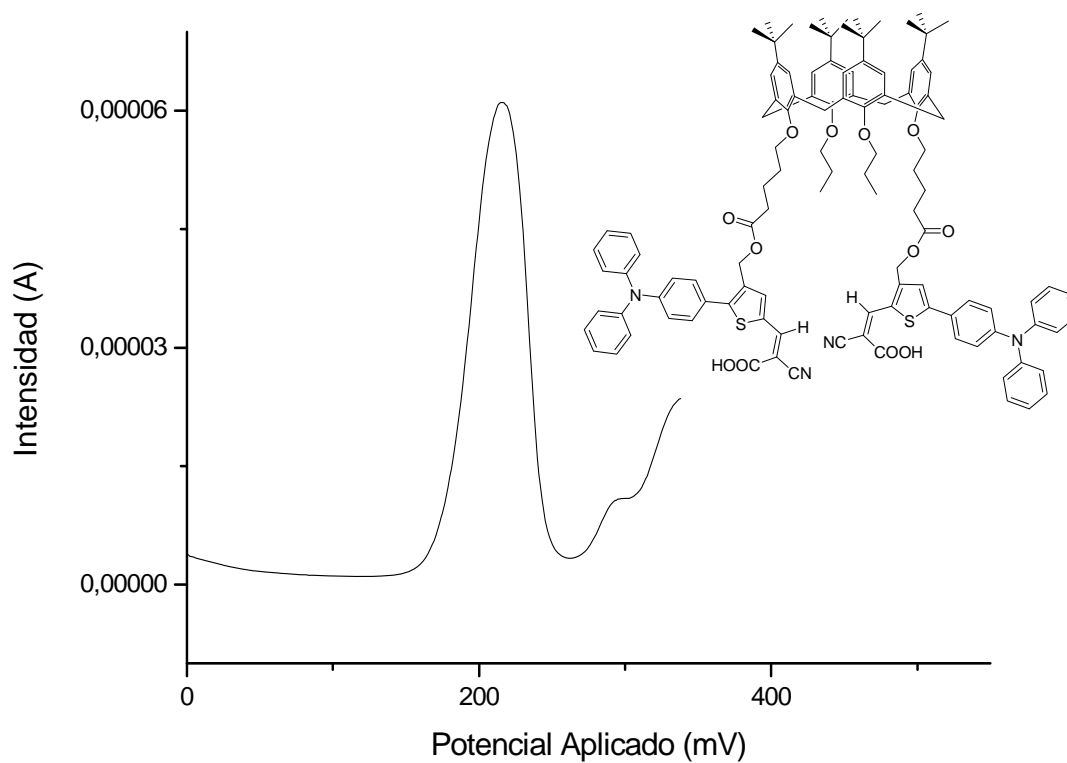


Figura 7.59. Voltamograma de pulso diferencial de (15).

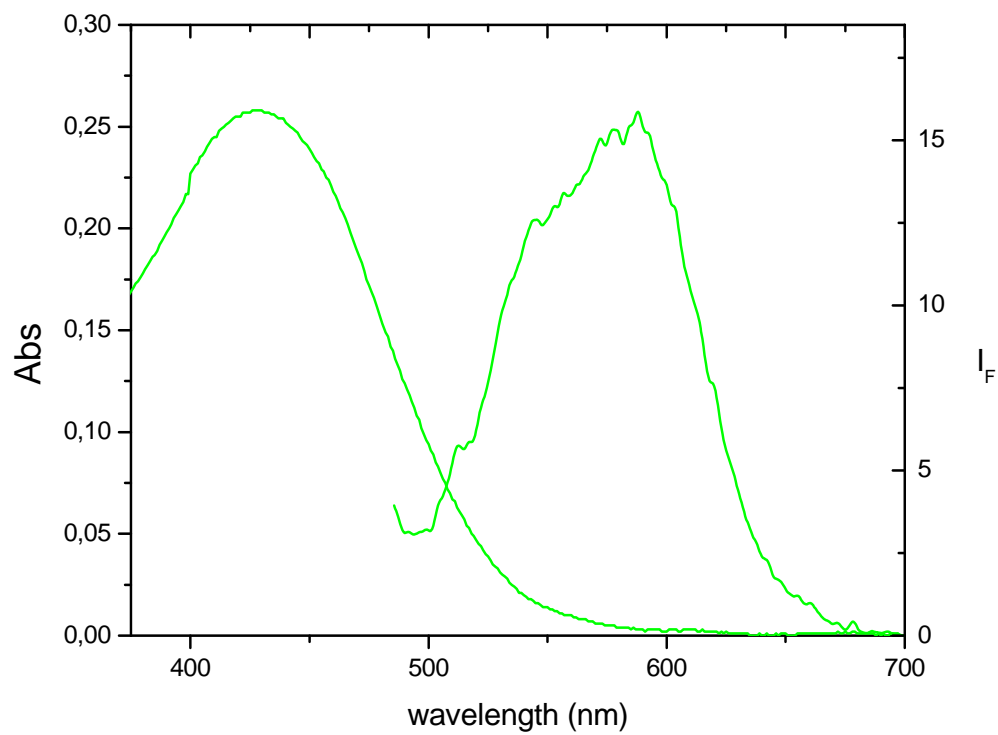


Figura 7.60. Diagrama  $\lambda_{CORTE}$  UV-visible/fluorescencia de (14).

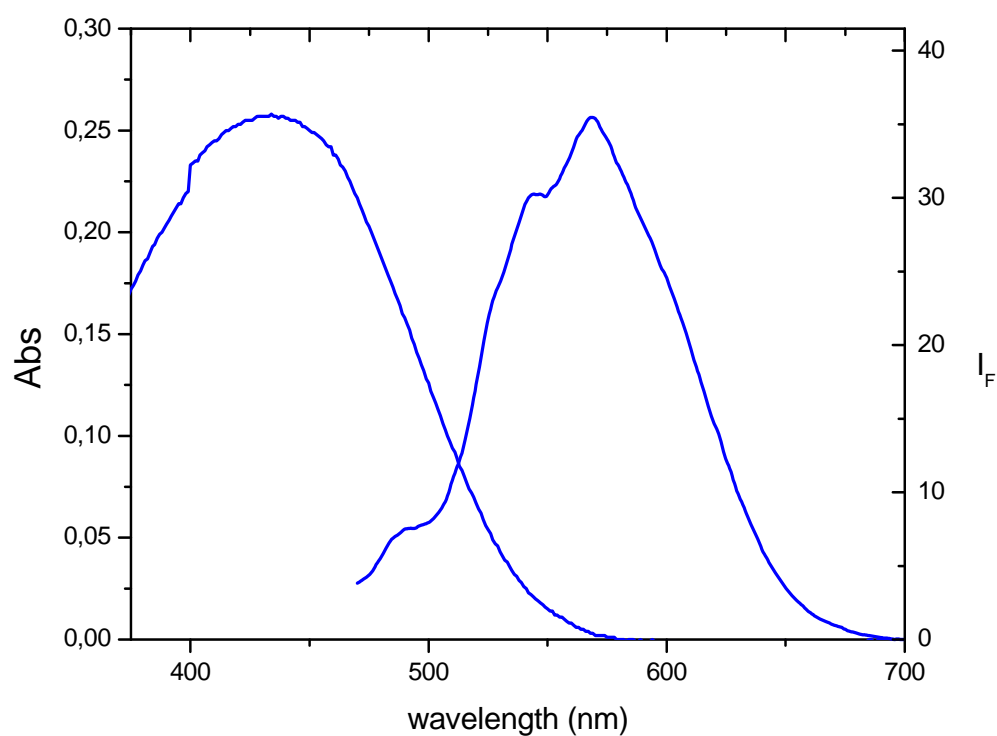


Figura 7.61. Diagrama  $\lambda_{CORTE}$  UV-visible/fluorescencia de (15).

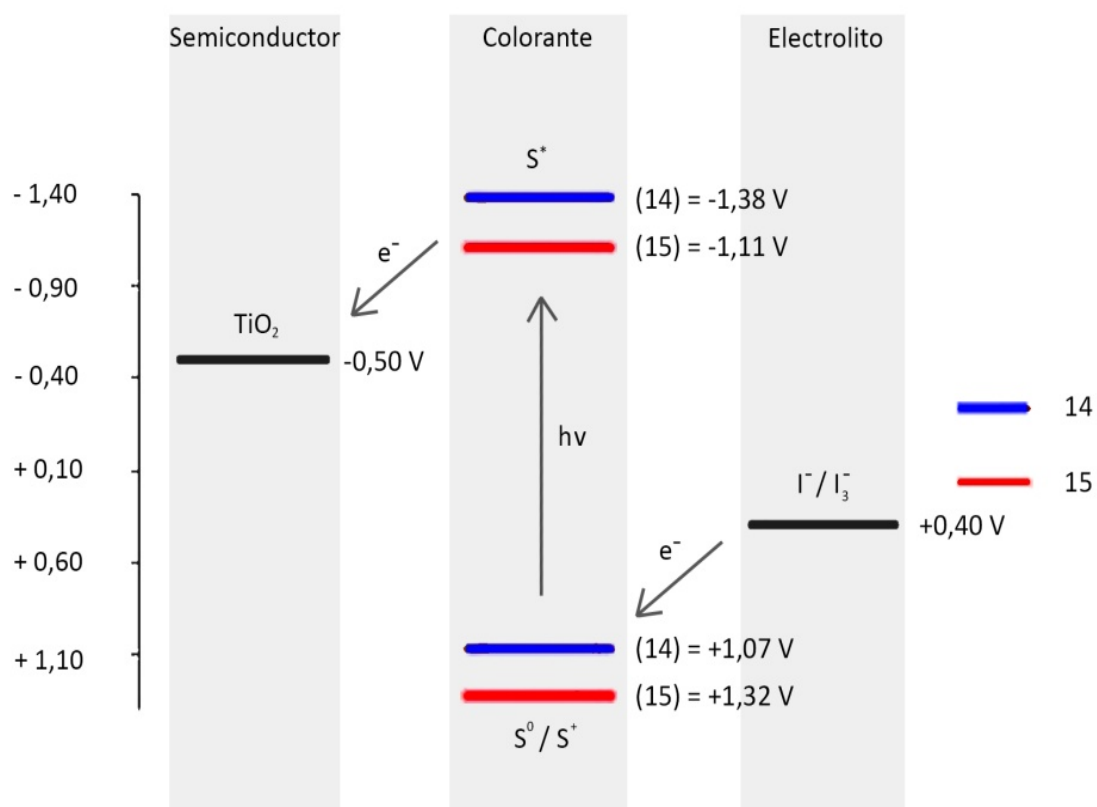


Figura 7.62. Diagrama niveles HOMO-LUMO de (14) y (15).