ESAMI DI STATO PER L'ABILITAZIONE ALL'ESERCIZIO DELLA PROFESSIONE DI CHIMICO JUNIOR

SECONDA SESSIONE DELL'ANNO 2013

Prima prova scritta

Metodi gas-cromatografici

Proprietà e reattività delle olefine

Parametri che influenzano un equilibrio chimico

ESAMI DI STATO PER L'ABILITAZIONE ALL'ESERCIZIO DELLA PROFESSIONE DI CHIMICO JUNIOR

SECONDA SESSIONE DELL'ANNO 2013

Seconda prova scritta

Tecniche analitiche di composti solidi

Polimeri e loro caratterizzazione

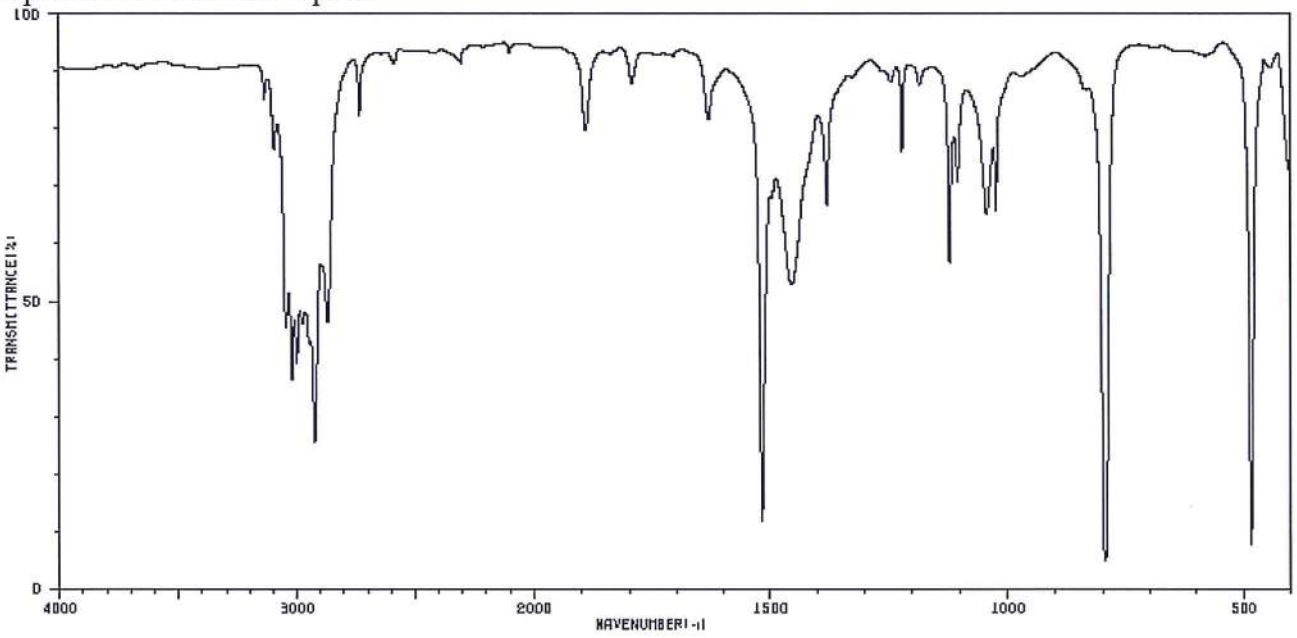
Composti organici chirali

COMPOSTO 5: formula bruta C8H10

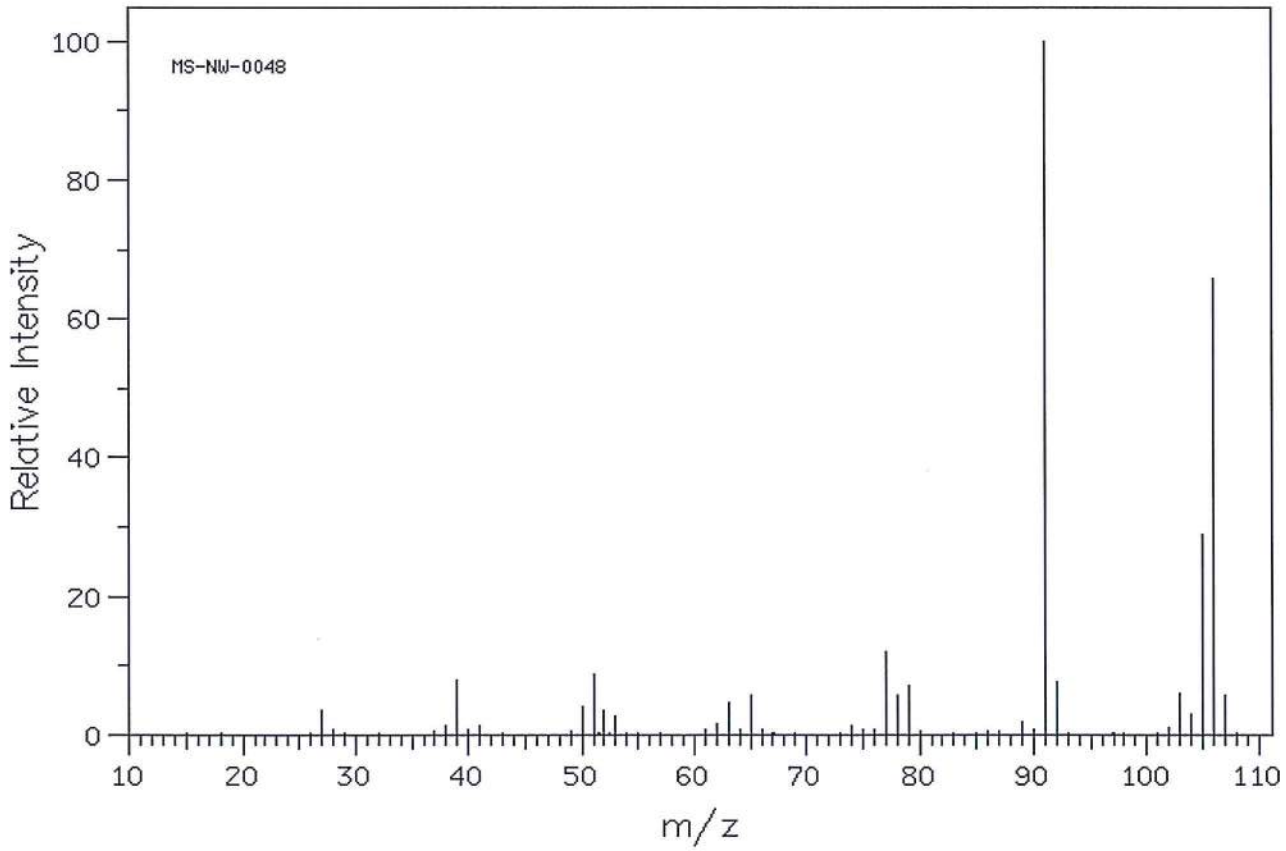
Identificare il composto dai dati presentati.
Distinguere i due isomeri A e B spiegando le attribuzioni

ISOMERO A

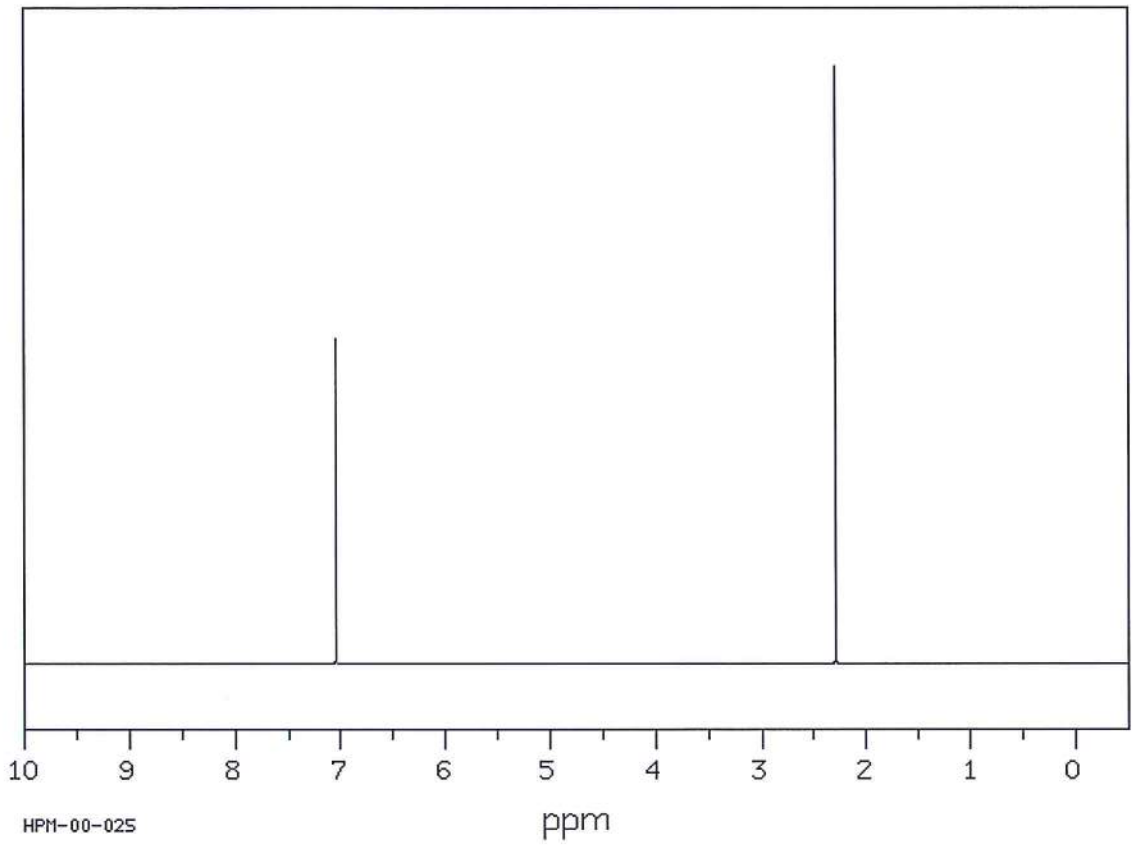
Spettro FT IR in film liquido



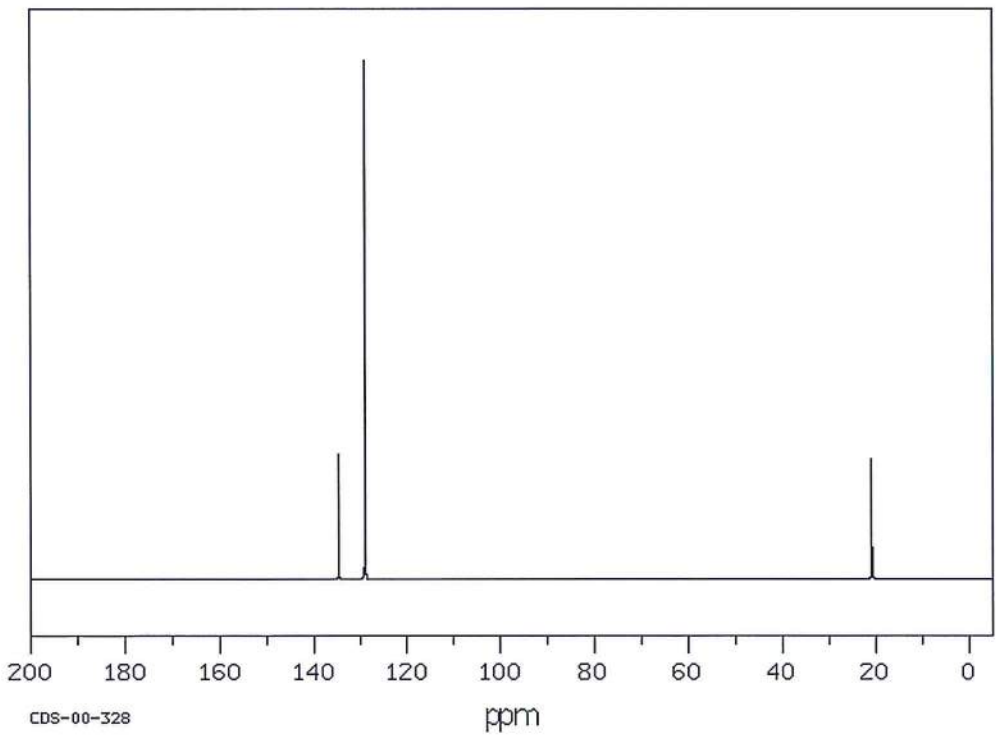
Spettro di massa



Spettro 1H NMR in CDCl3

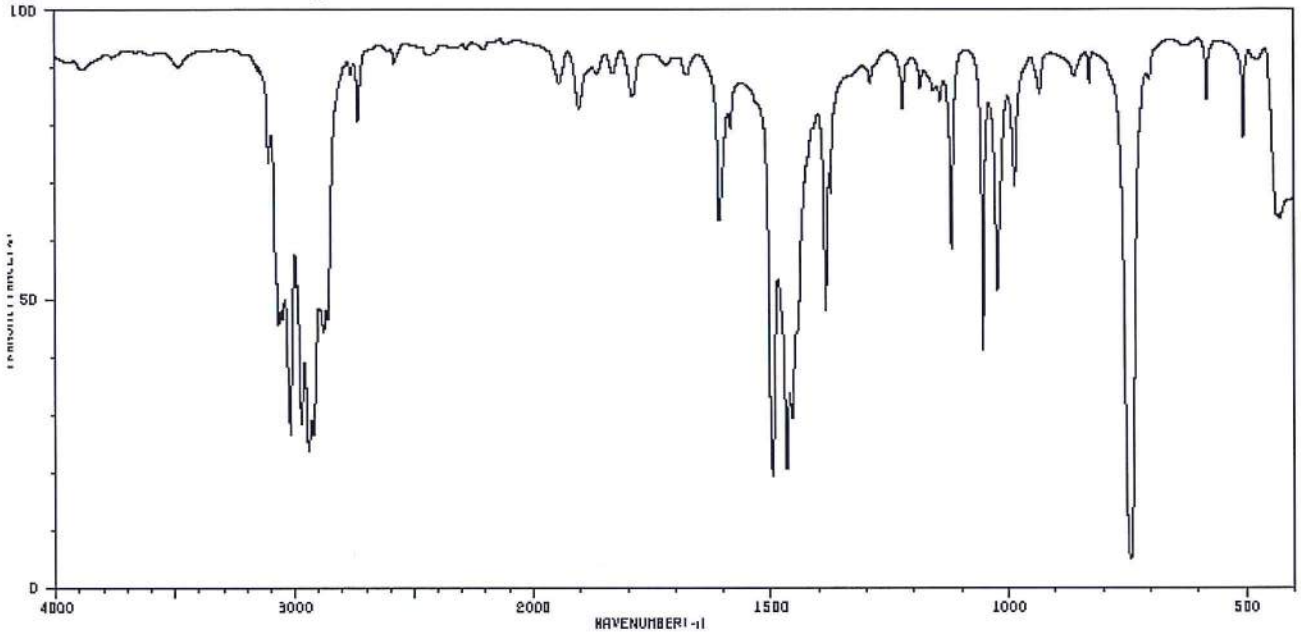


Spettro 13 C NMR in CDCl3

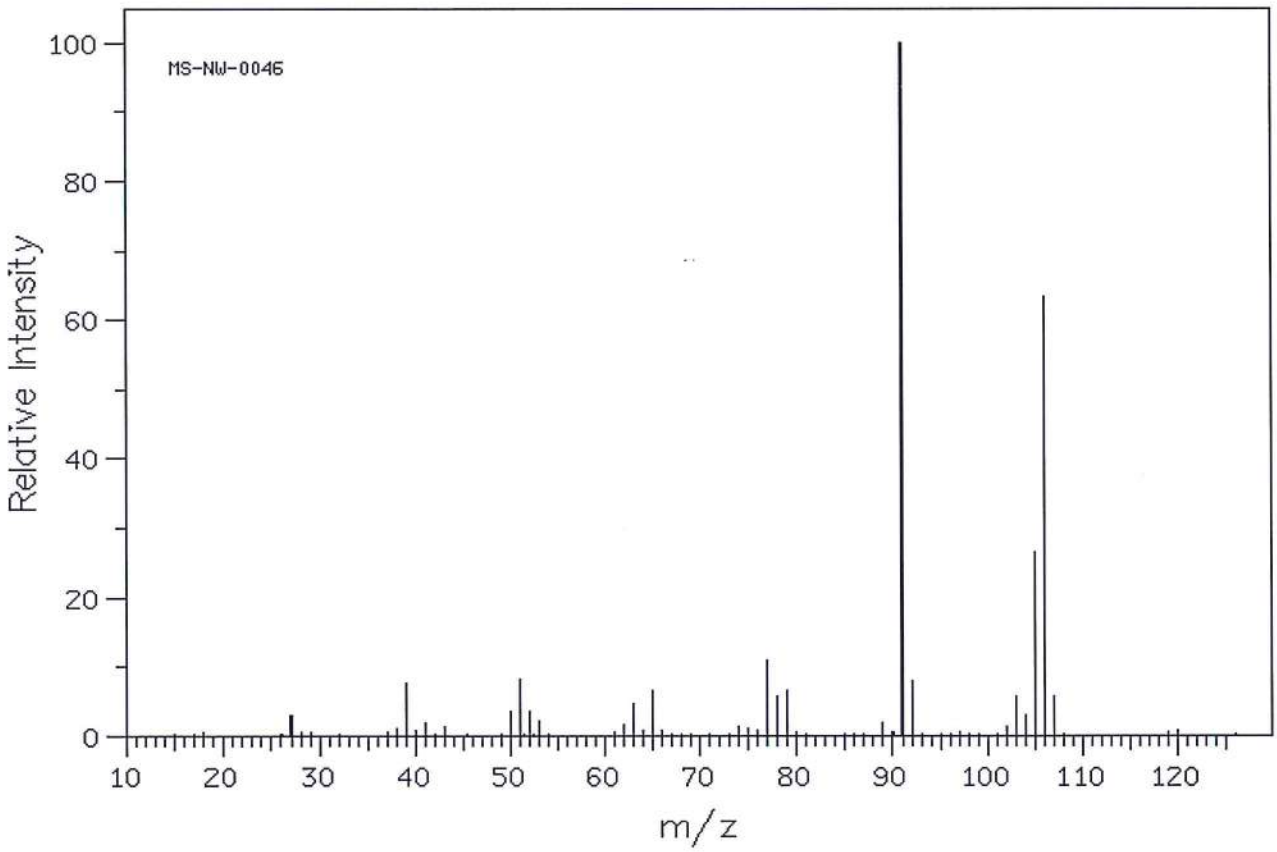


ISOMERO B

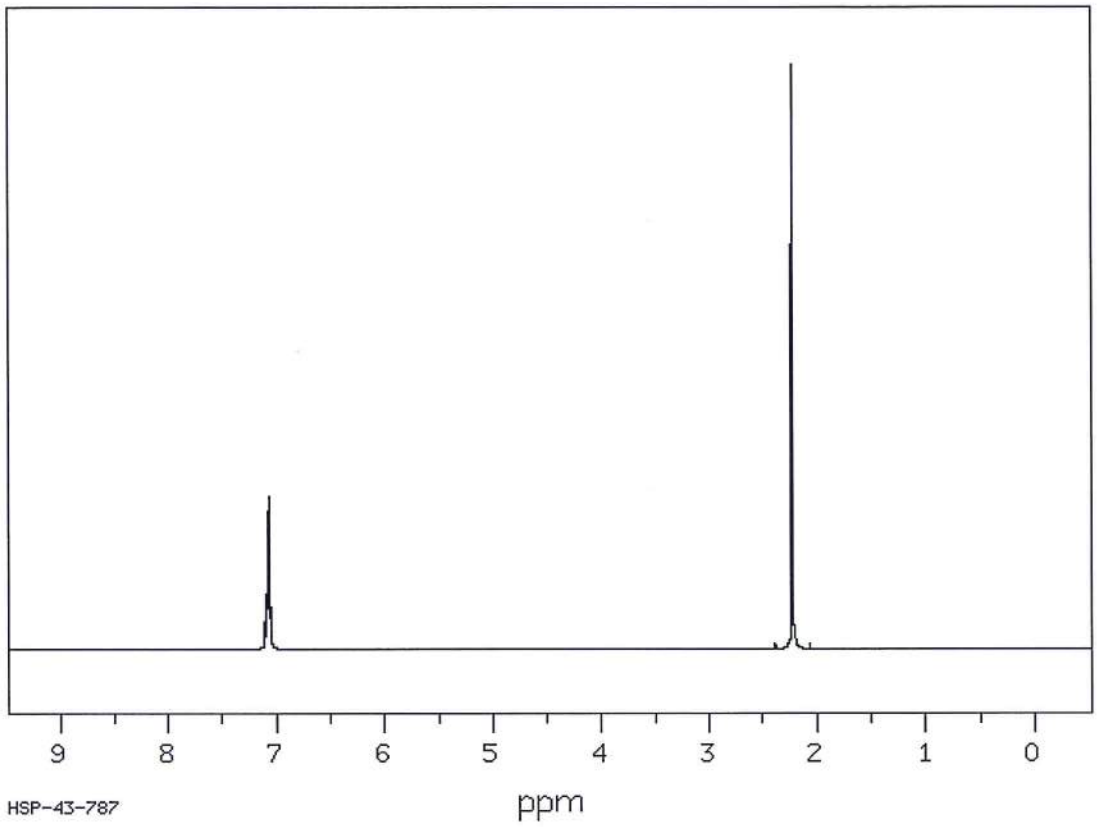
Spettro FT IR in film liquido



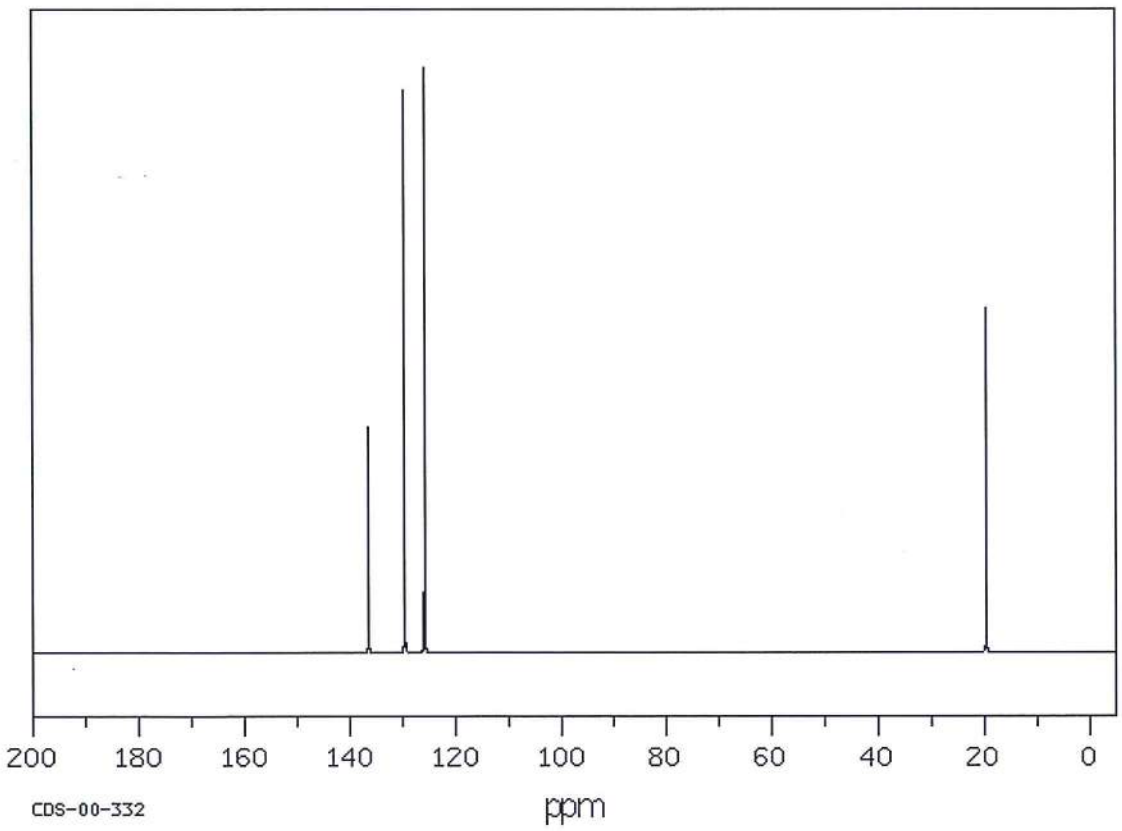
spettro di massa



Spettro 1H NMR



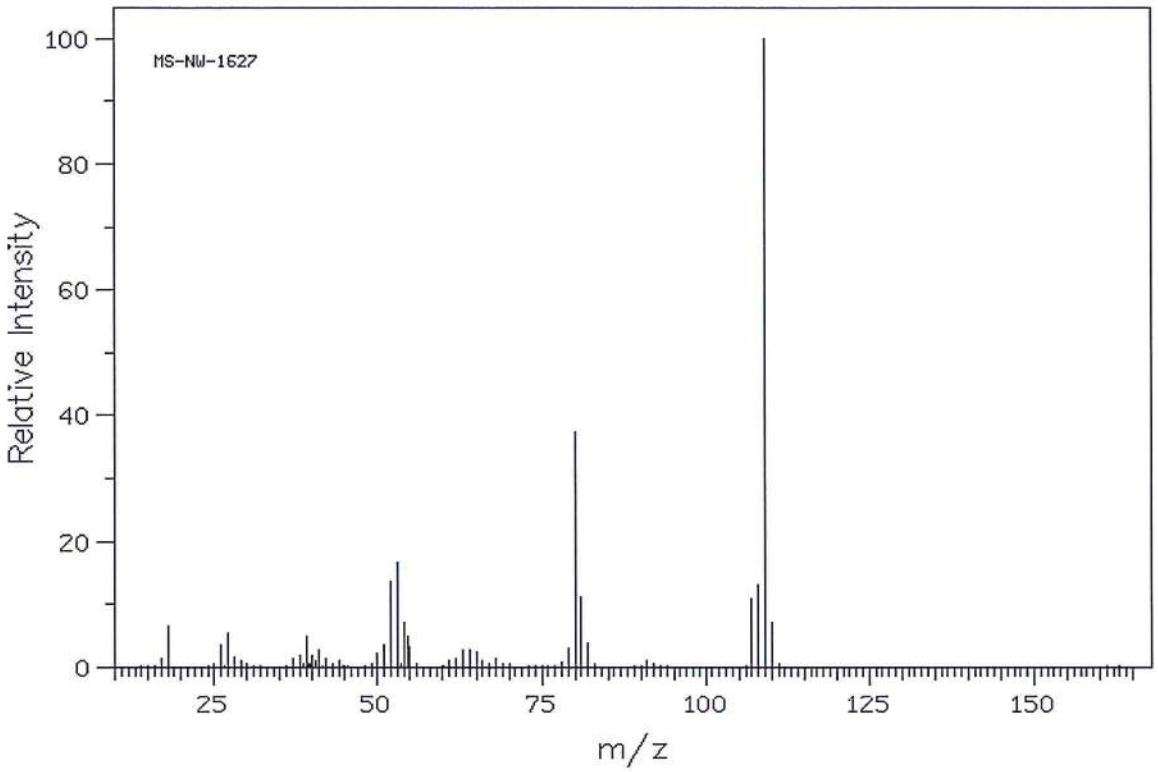
spettro 13C NMR



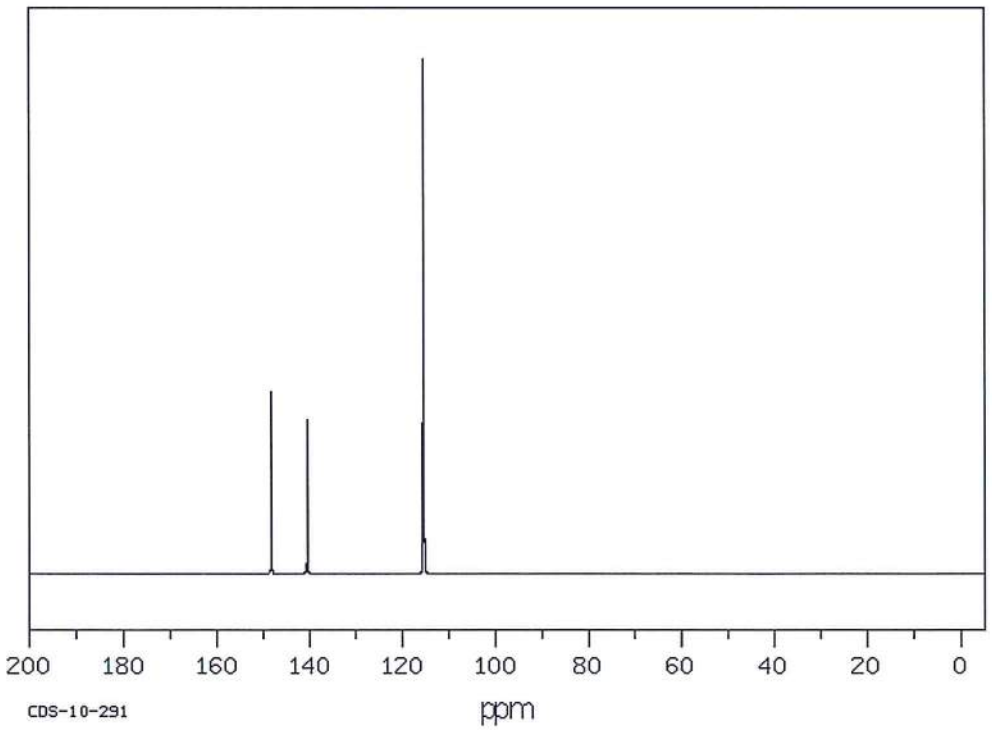
COMPOSTO 1: FORMULA BRUTA C_6H_7NO

Identificare il composto dai dati presentati.
Distinguere i due isomeri A e B spiegando le attribuzioni

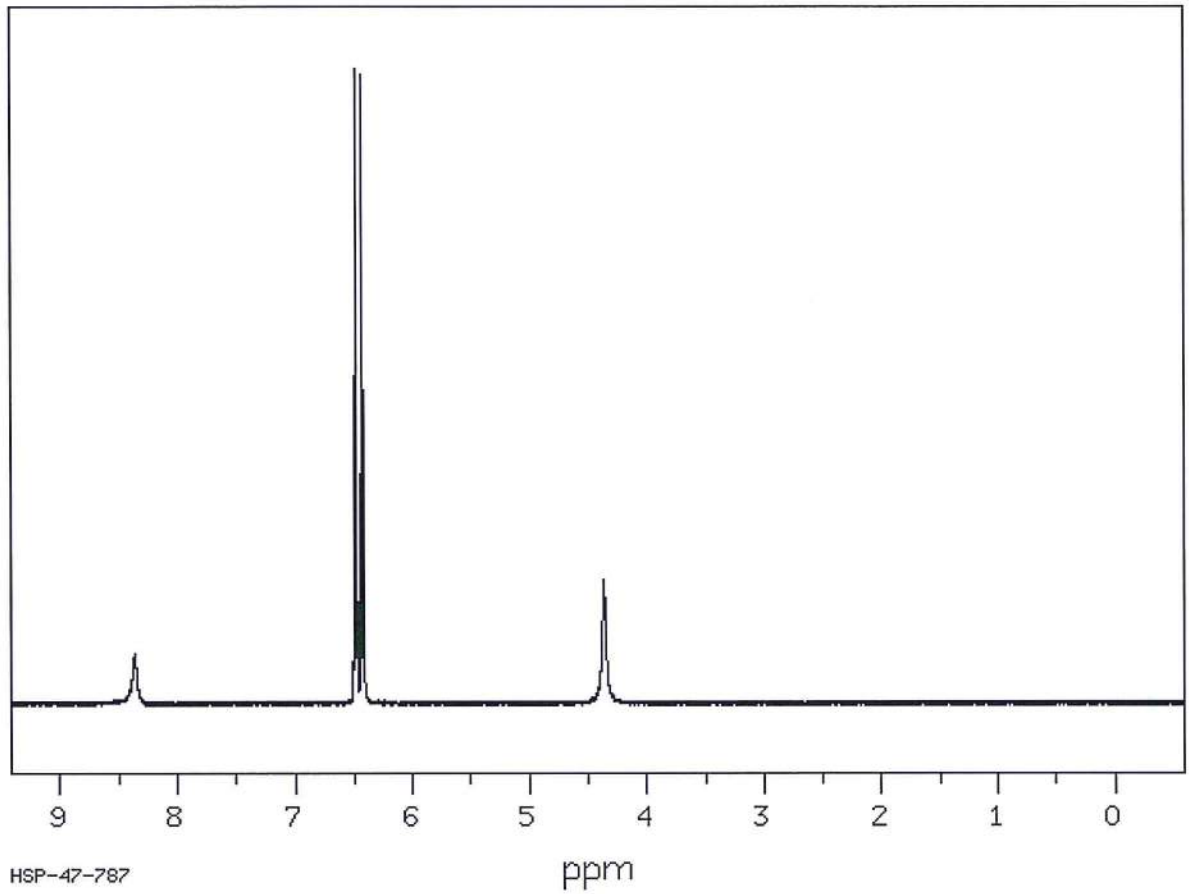
ISOMERO A) spettro di massa



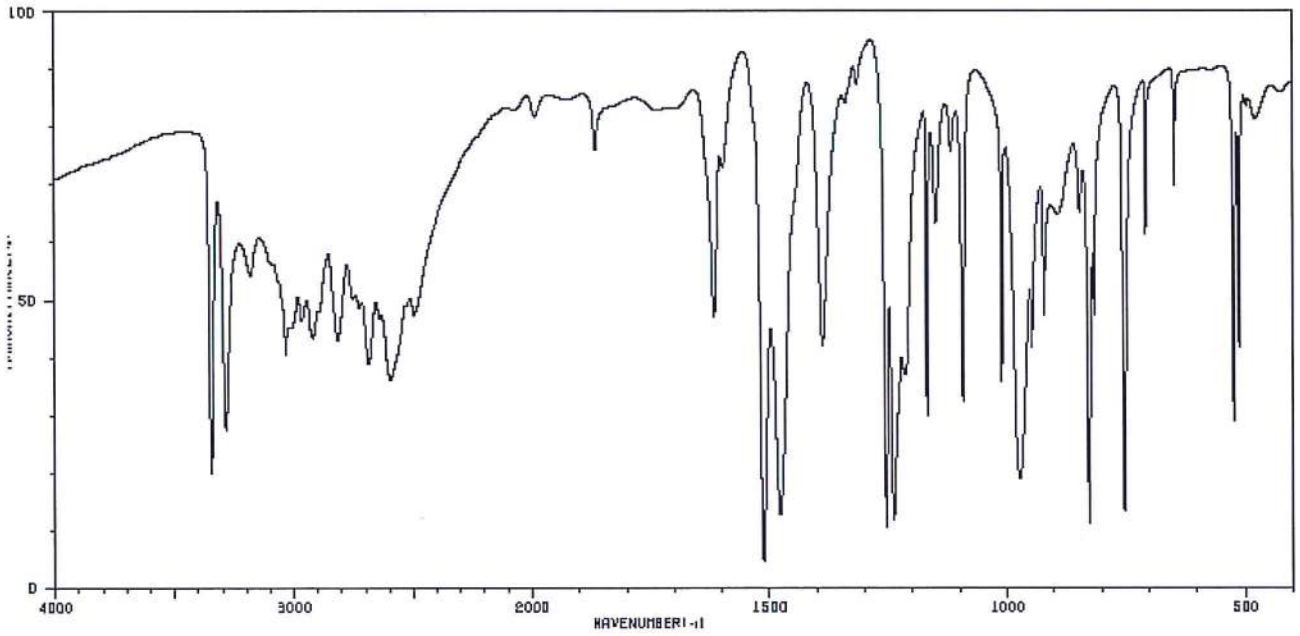
spettro 13C NMR



spettro 1H NMR

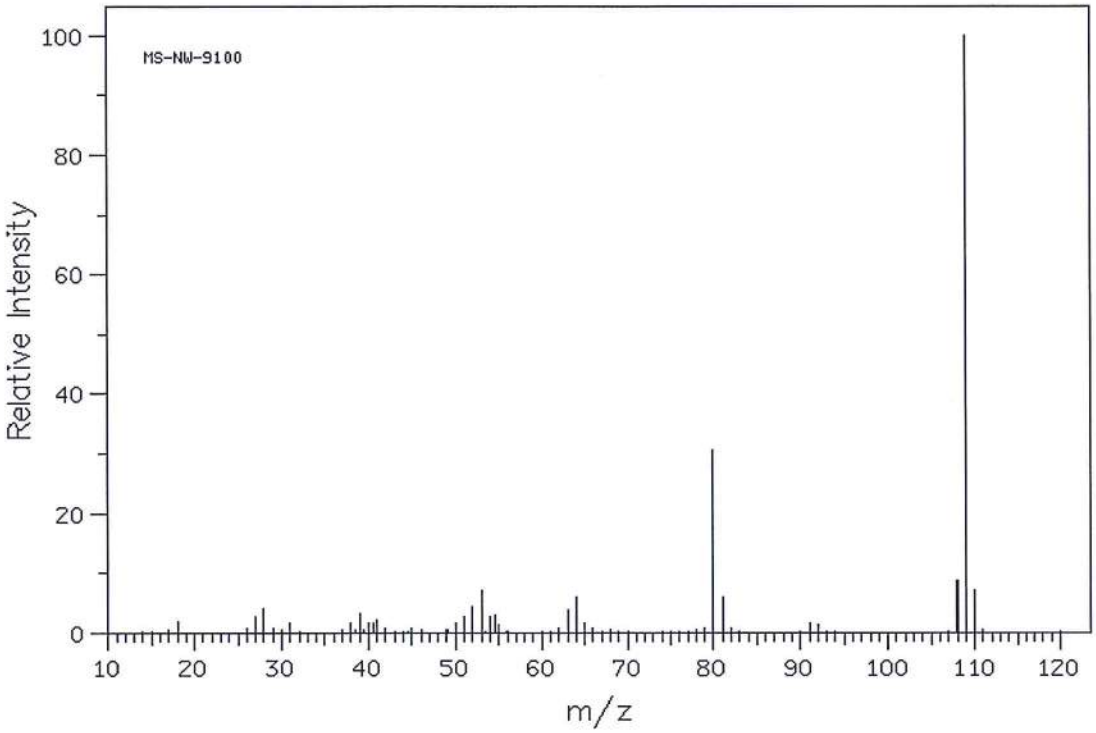


spettro FT IR

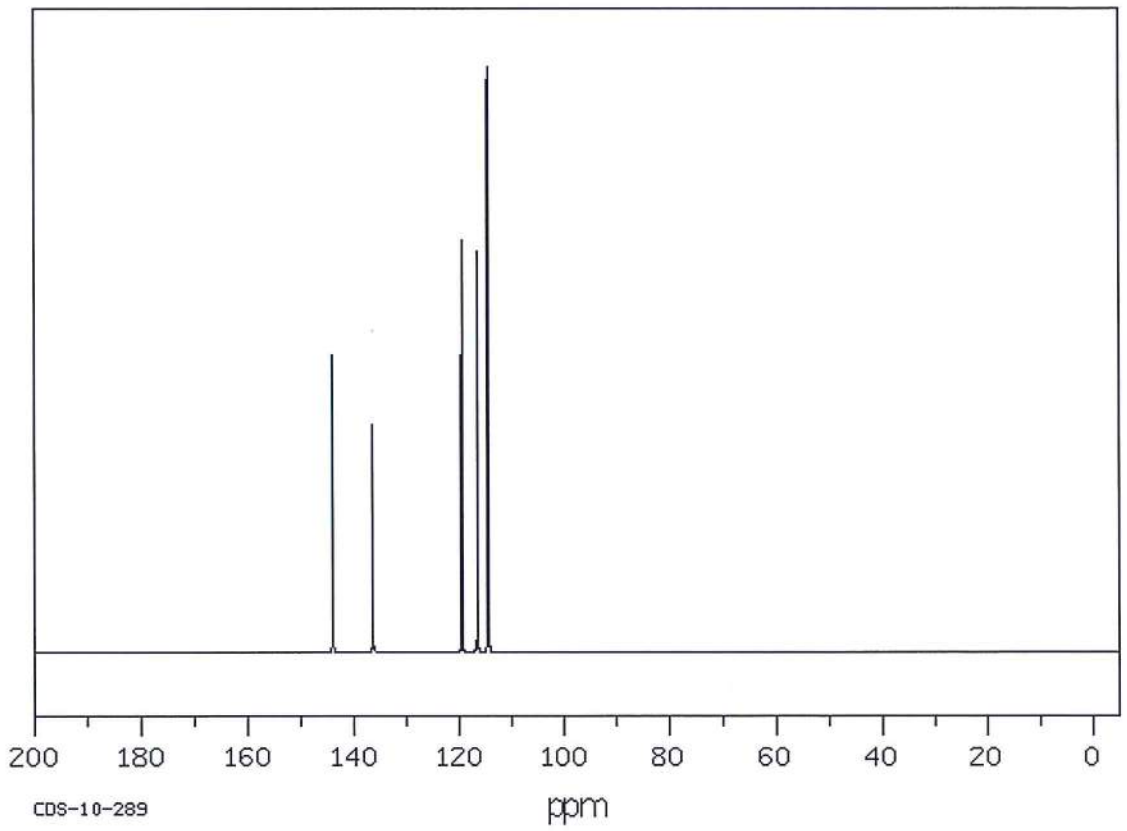


ISOMERO B

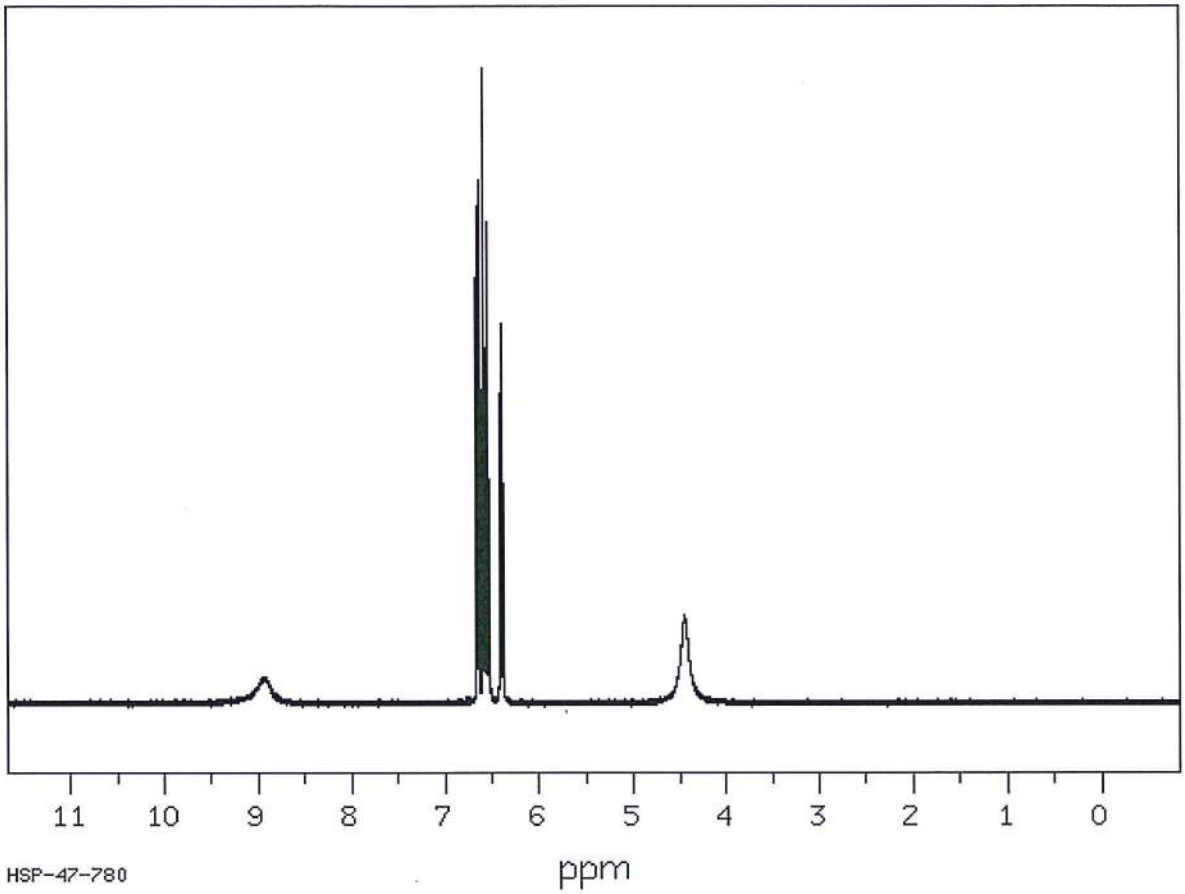
Spettro di massa



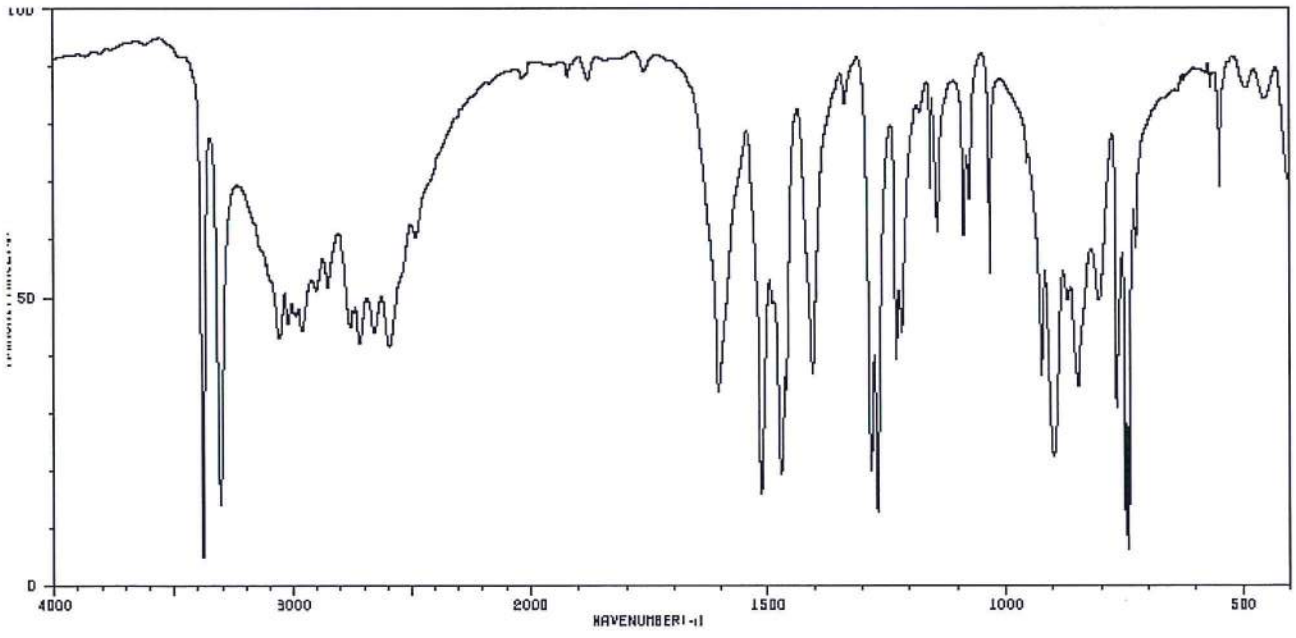
Spettro 13C NMR in DMSO



Spettro 1H NMR in DMSO

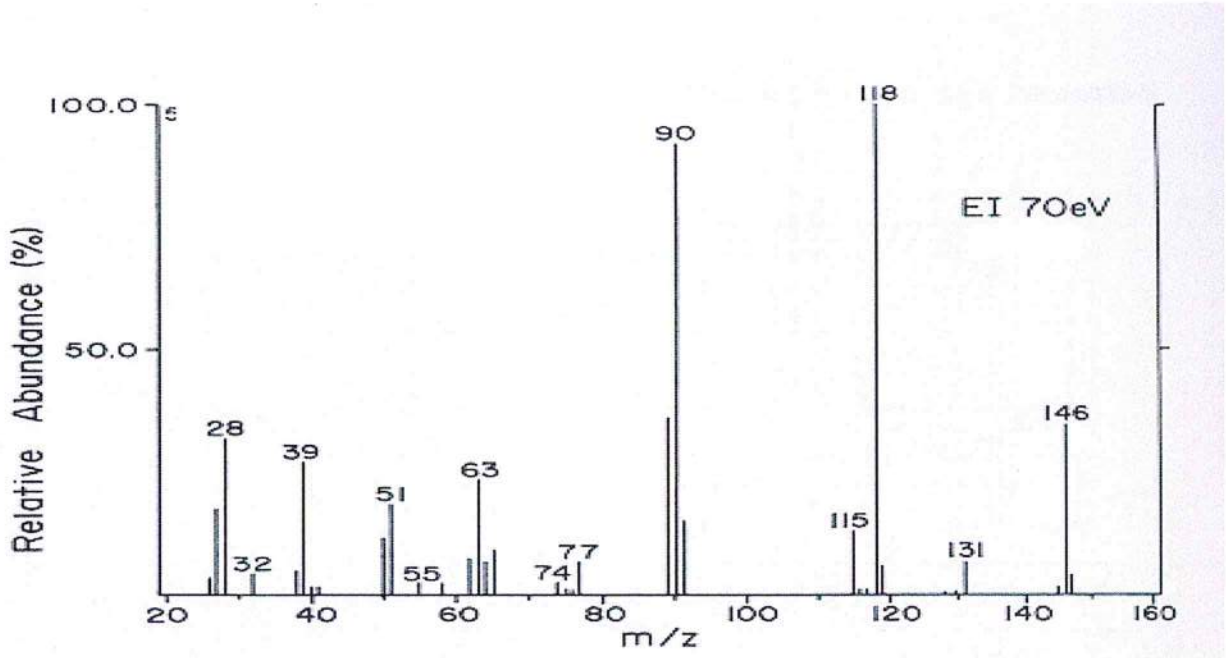


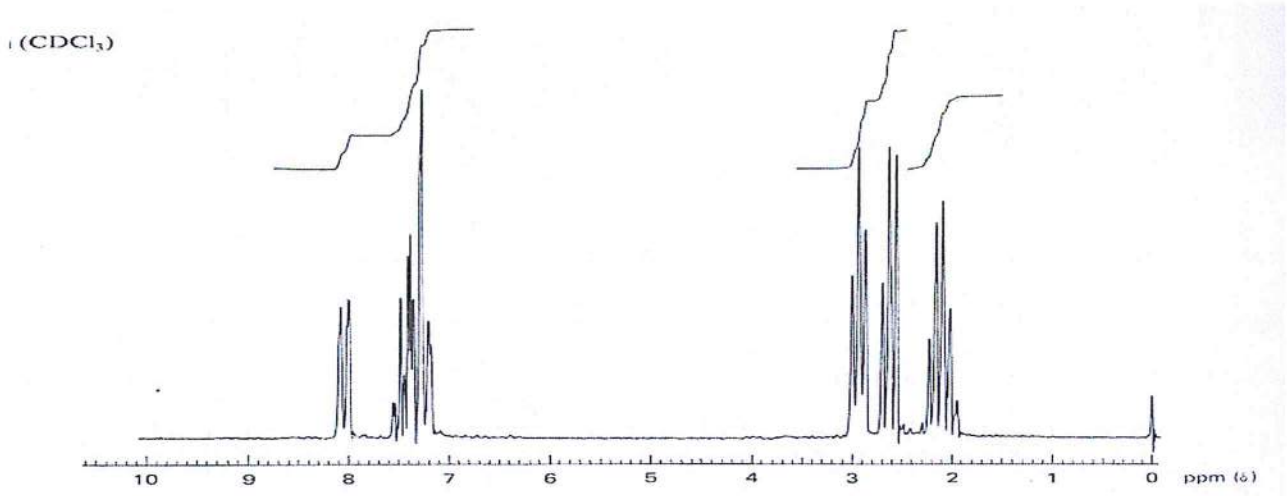
Spettro FT IR in KBr

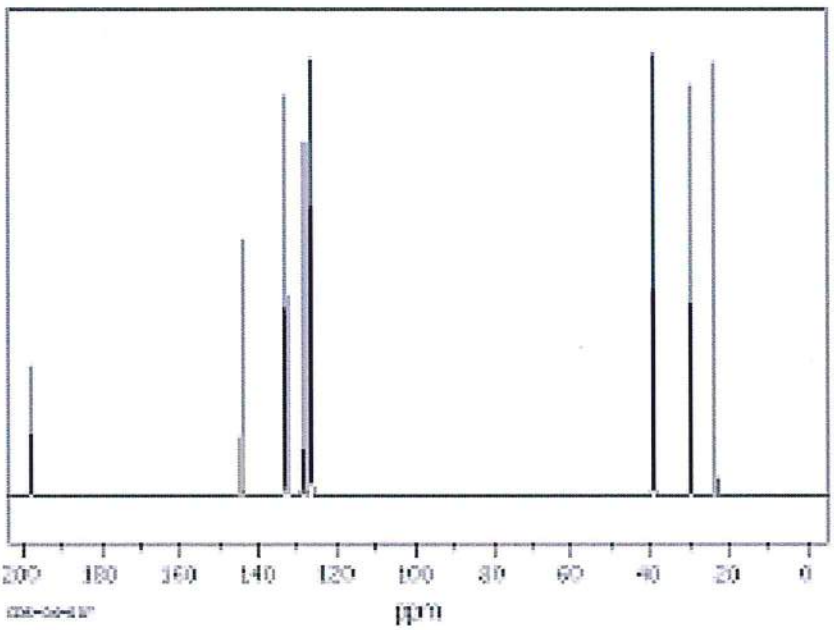


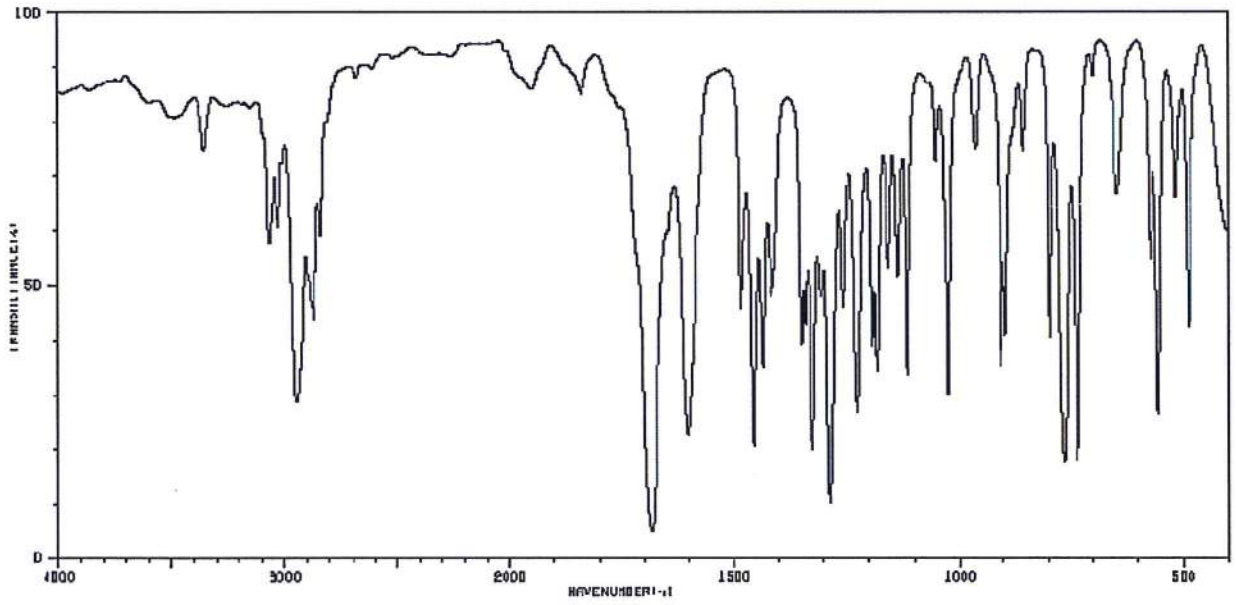
COMPOSTO 9: FORMULA BRUTA $C_{10}H_{10}O$

La formula di questo composto è $C_{10}H_{10}O$. Determinatene la struttura utilizzando lo spettro massa (EI), ^{1}H e ^{13}C NMRe IR. Lo spettro IR è stato ottenuto come film liquido puro.





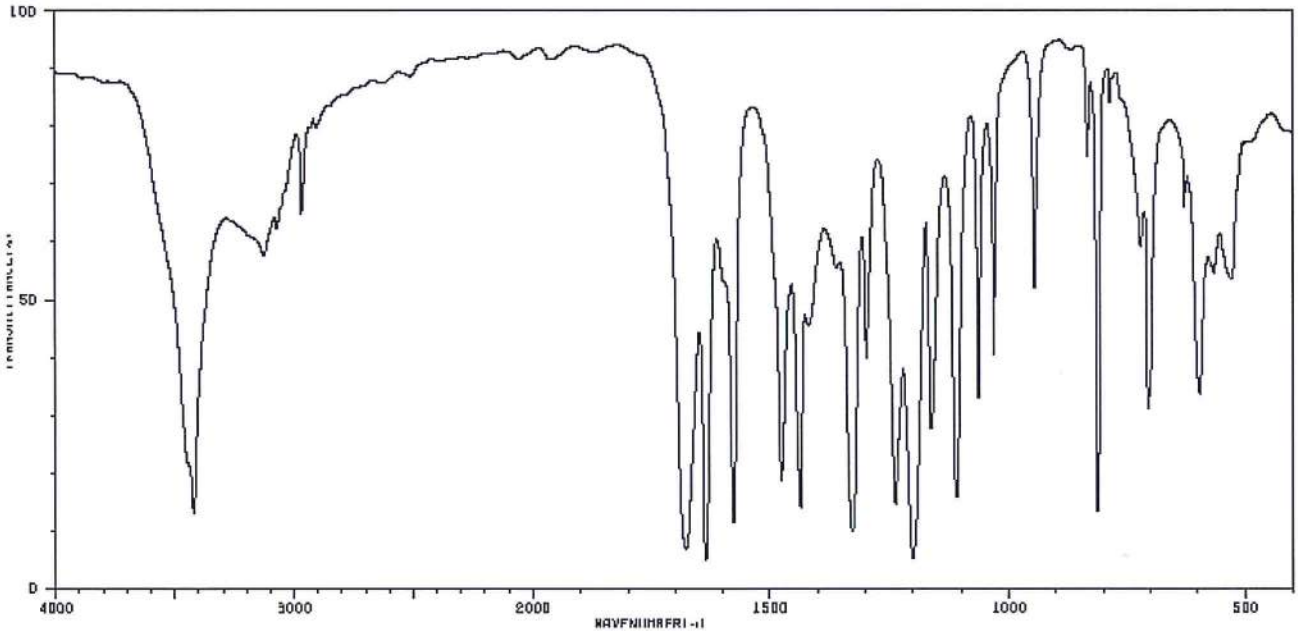

200
180
160
140
120
100
80
60
40
20
0


100
50
0
4000
3000
2000
1500
1000
500

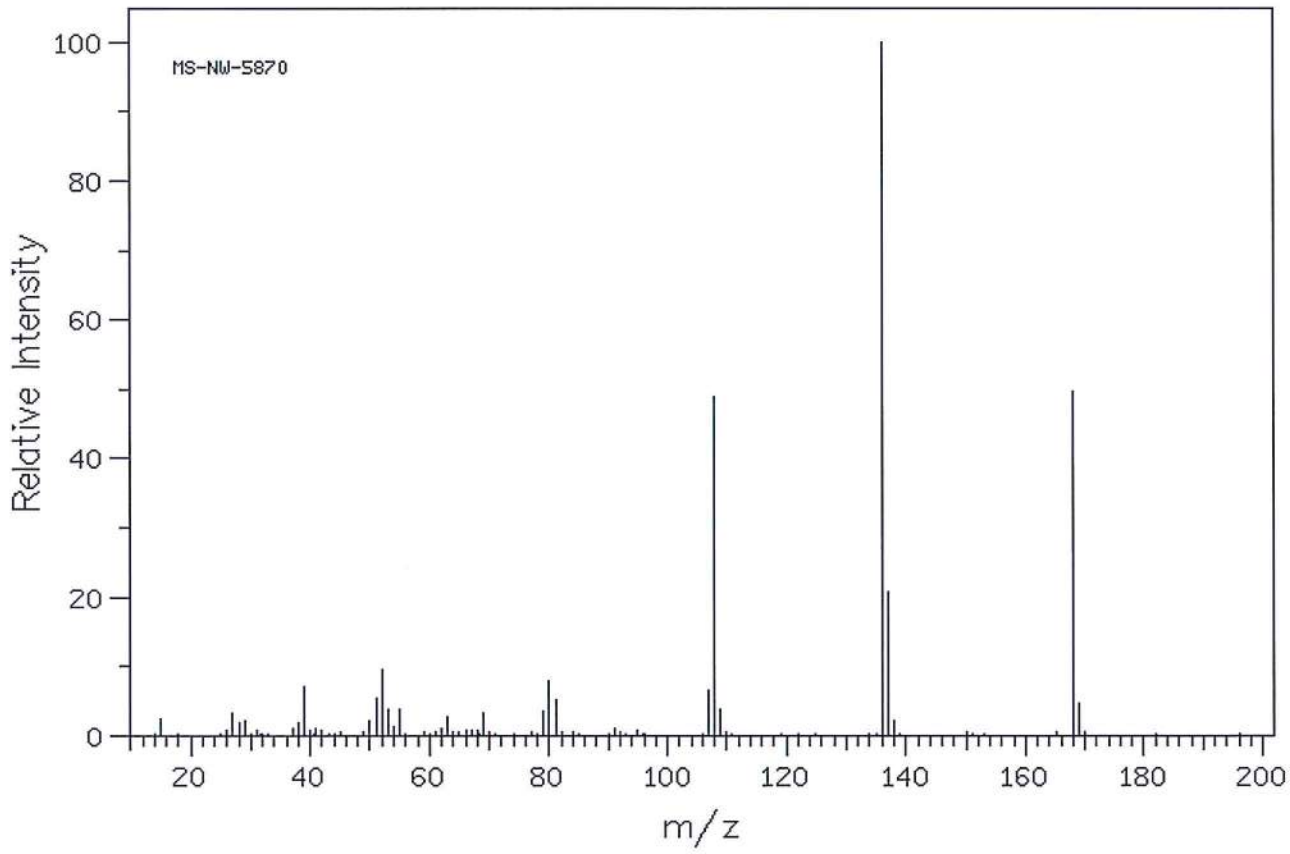
COMPOSTO 6 formula bruta C8H8O4

Identificare il seguente composto, spiegando le motivazioni e il processo logico seguito

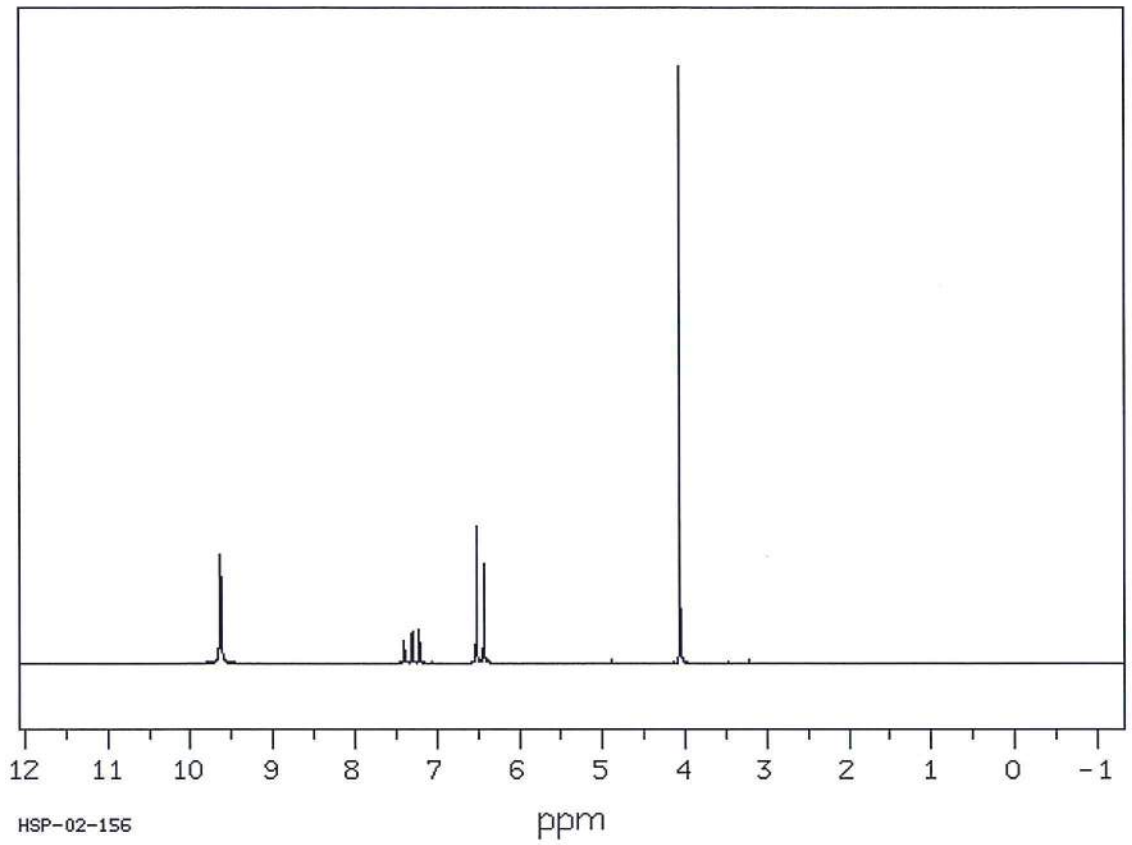
Spettro FT IR in KBr



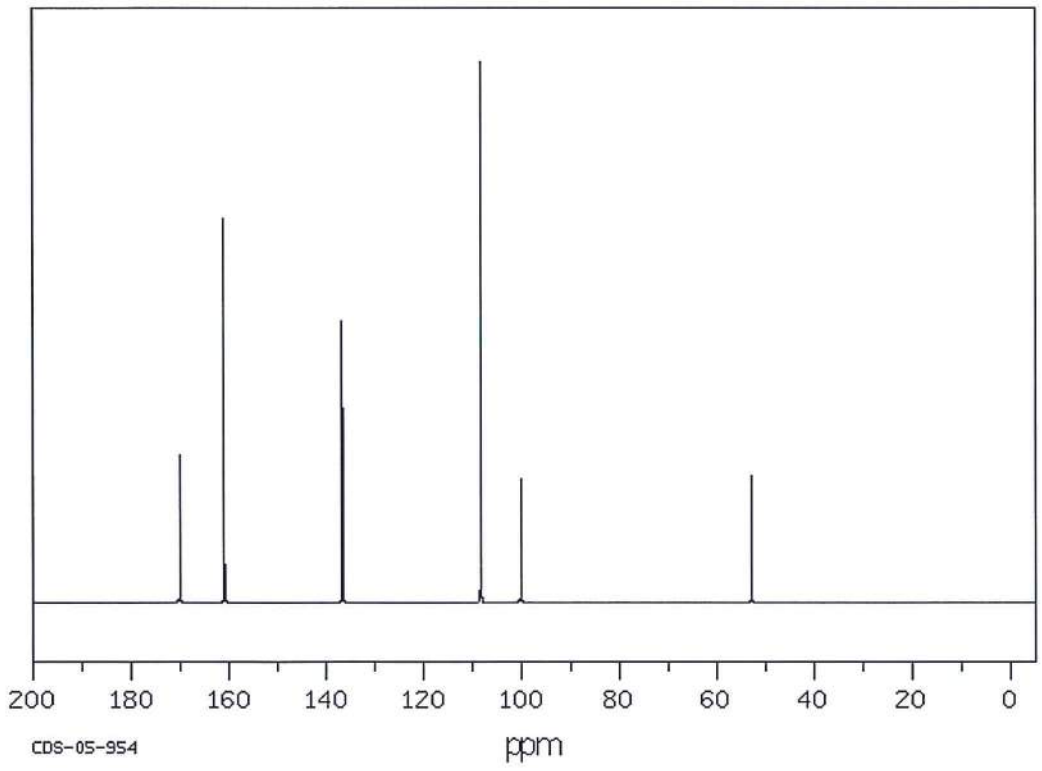
Spettro di massa



spettro 1H NMR in CDCl3



spettro 13 C NMR

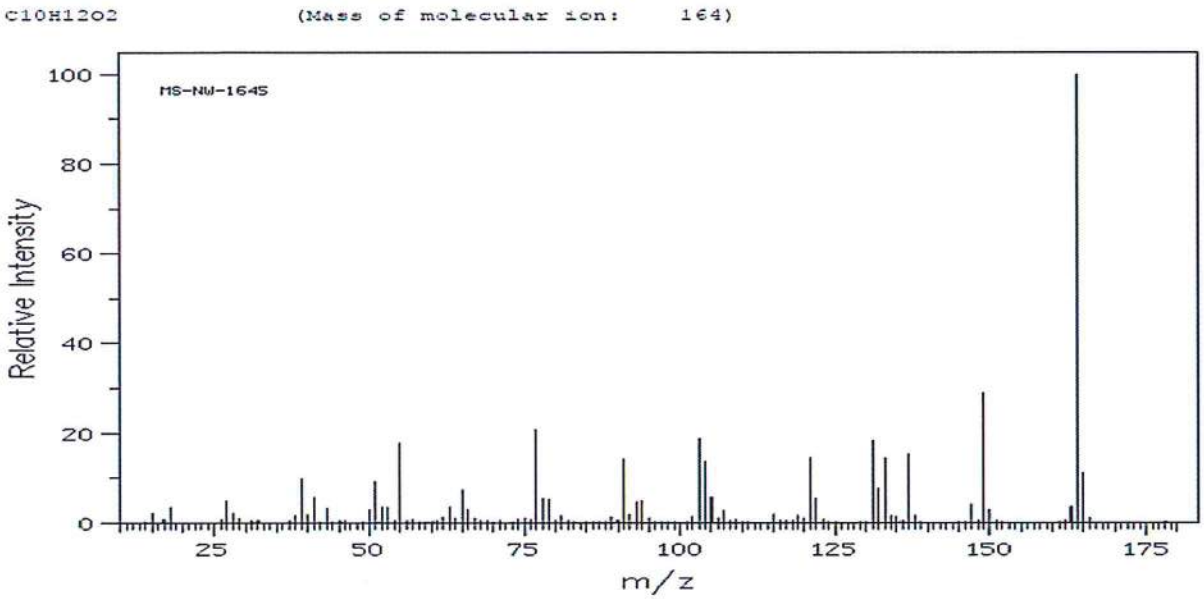


RB

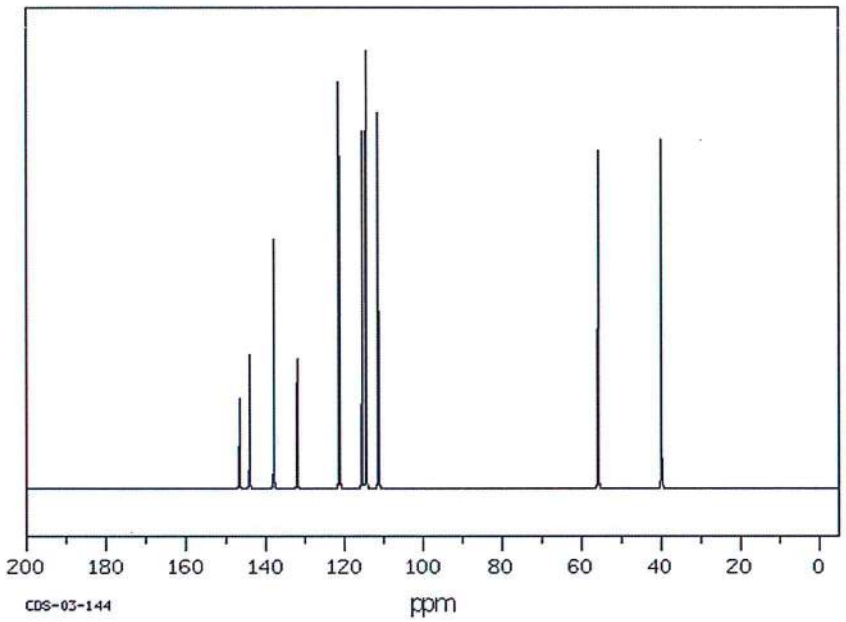
COMPOSTO 8: FORMULA BRUTA $C_{10}H_{12}O2$

Identificare il composto dai dati presentati.

MS (EI)

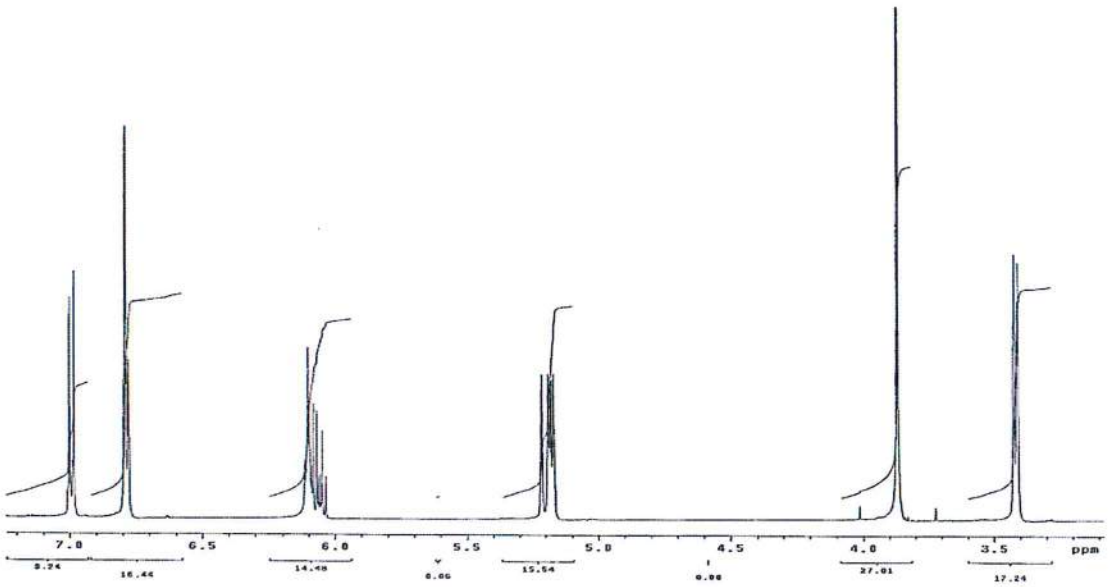


spettro ^{13}C NMR ($CDCl_3$, 15.09 MHz, 20% vol)



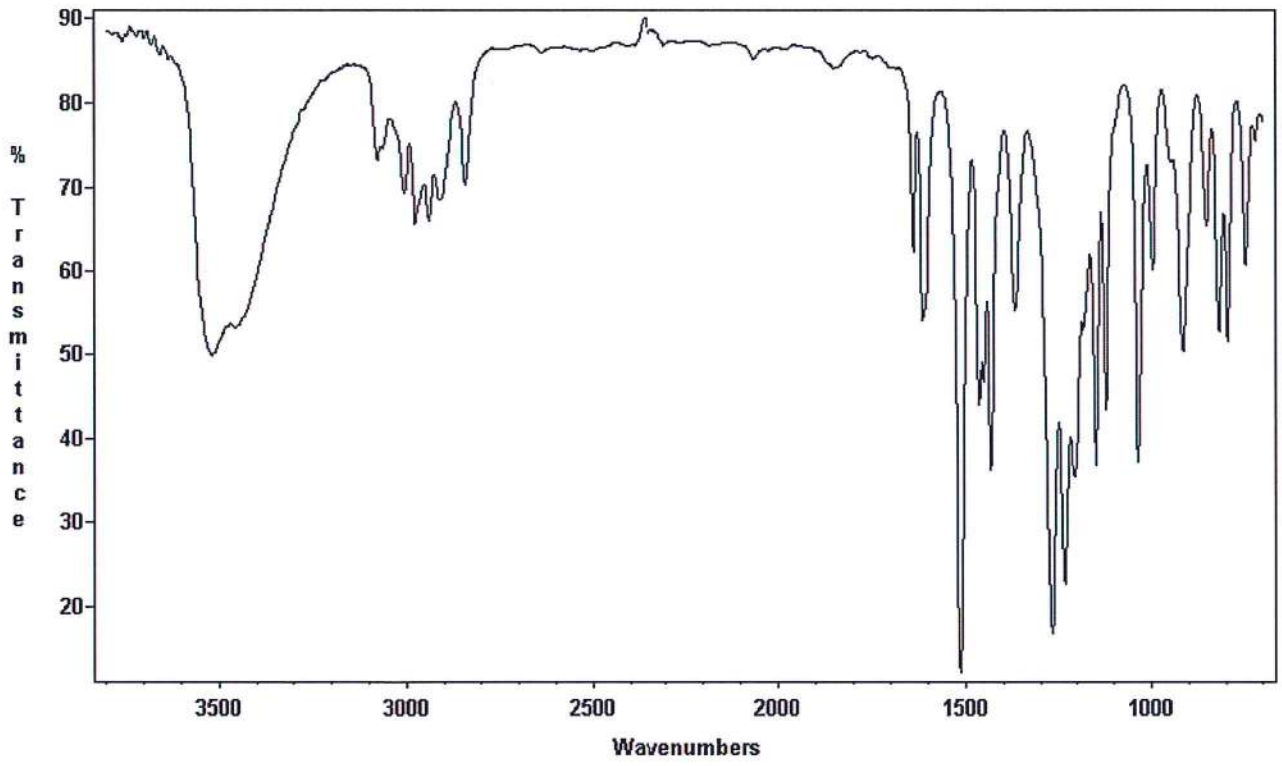
ppm	Int.	Assign.
146.60	205	1
144.03	305	2
137.91	567	3
131.94	295	4
121.26	929	5
115.49	814	6
114.46	1000	7
111.28	857	8
55.84	771	9
39.92	795	10

^{1}H NMR (399.65 MHz; CDCl3)



Shift(ppm)	Integral	Shift(ppm)	Integral	Shift(ppm)	Integral
6.832	1	5.933	1	5.039	1
6.66	1	5.73	1	3.801	3
6.65	1	5.058	1	3.291	2

IR Spectrum (liquid film)

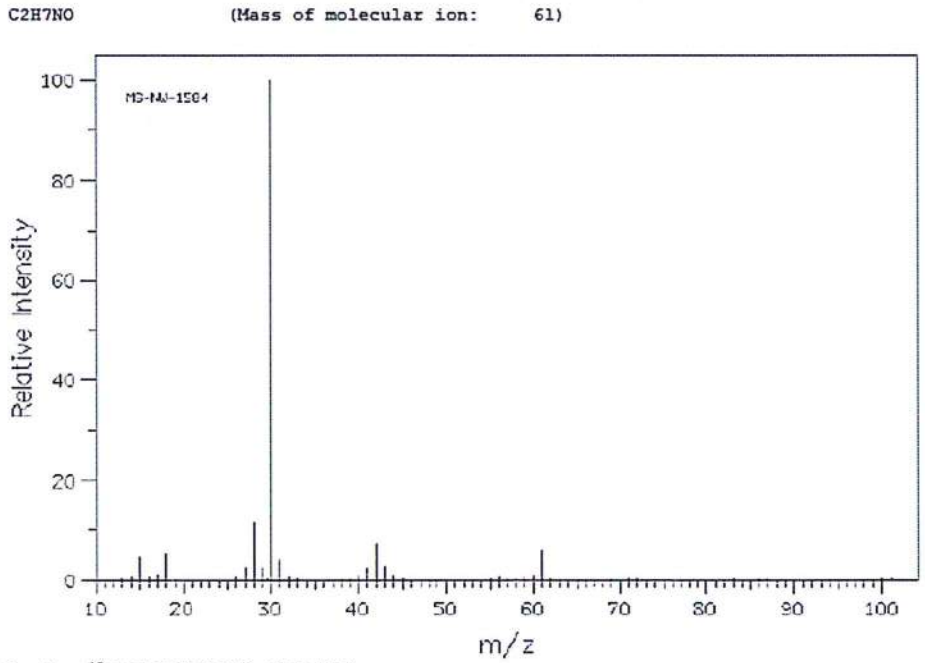


COMPOSTO 7: FORMULA BRUTA C_2H_7NO

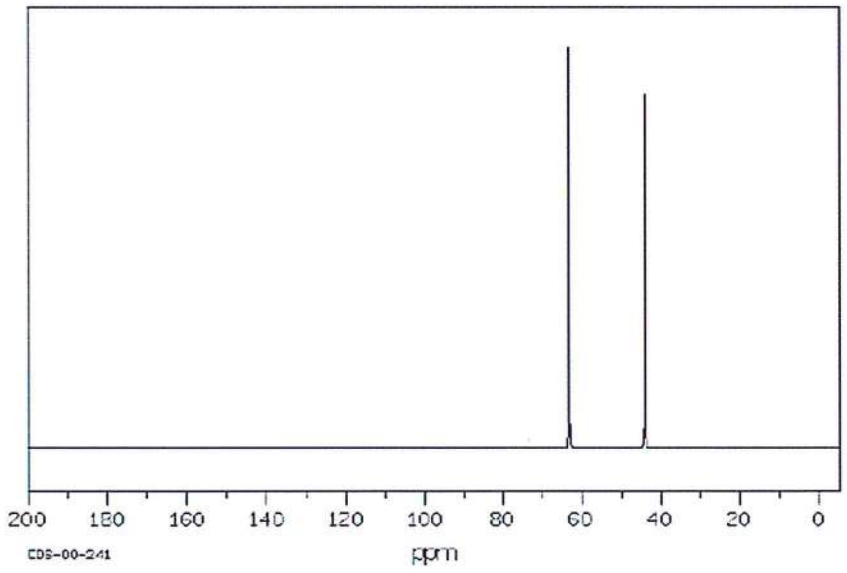
Identificare il composto dai dati presentati.

Spettro di massa (EI, 75 eV)

(Mass of molecular ion: 61)

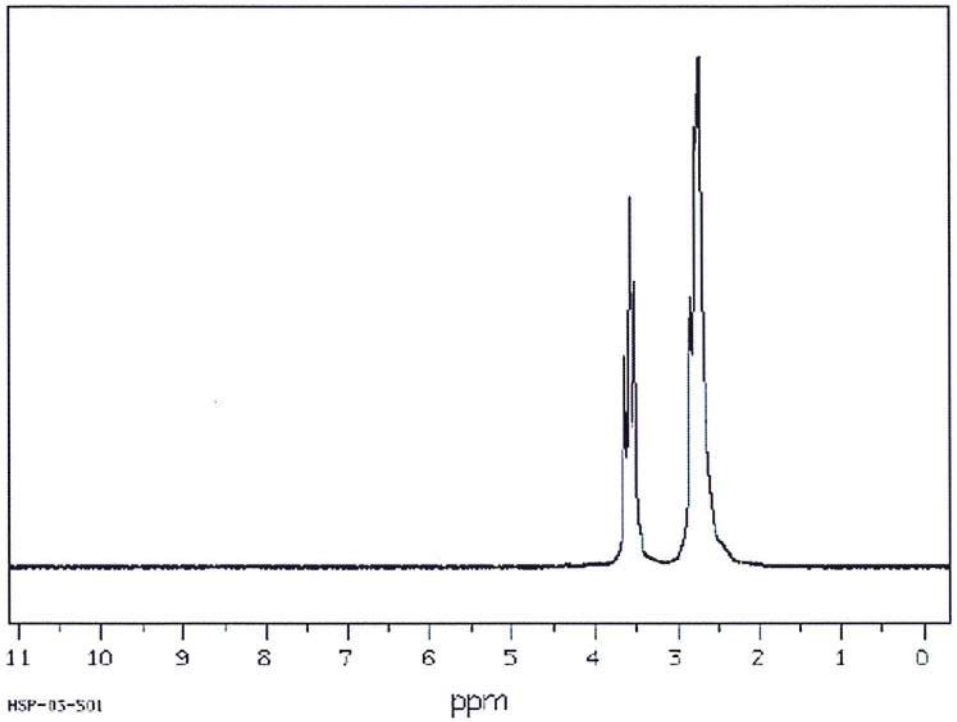


Spettro ^{13}C NMR (CDCl3, 16 MHz)



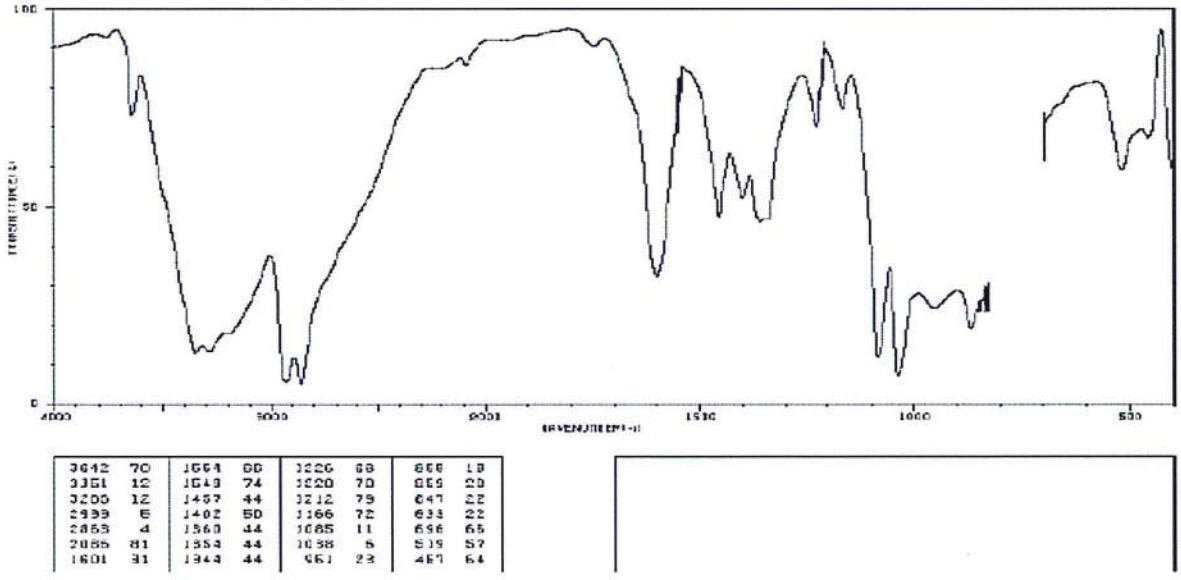
63.18	1000	2
43.96	883	1

^{1}H NMR ($CDCl_3$, 90 MHz)



^{1}H NMR: 3.56 ppm (2H); 2.78 ppm (2H); 2.76 ppm (2.76)

IR (liquid film)



3642	70	1664	60	1220	68	866	18
3351	12	1648	74	1220	70	819	20
3200	12	1457	44	1212	79	647	22
2939	6	1402	50	1166	72	633	22
2865	4	1360	44	1085	11	696	65
2855	81	1353	44	1038	5	519	57
1601	31	1344	44	961	23	487	64