

**An Eco-Friendly Protocol for Amide Production: Employing
Kaolin/Dextrin/Zinc as a Heterogeneous Catalyst**

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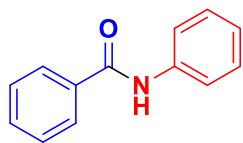
Mashhad, Iran.

**Corresponding Author E-mail: alishiri@um.ac.ir*

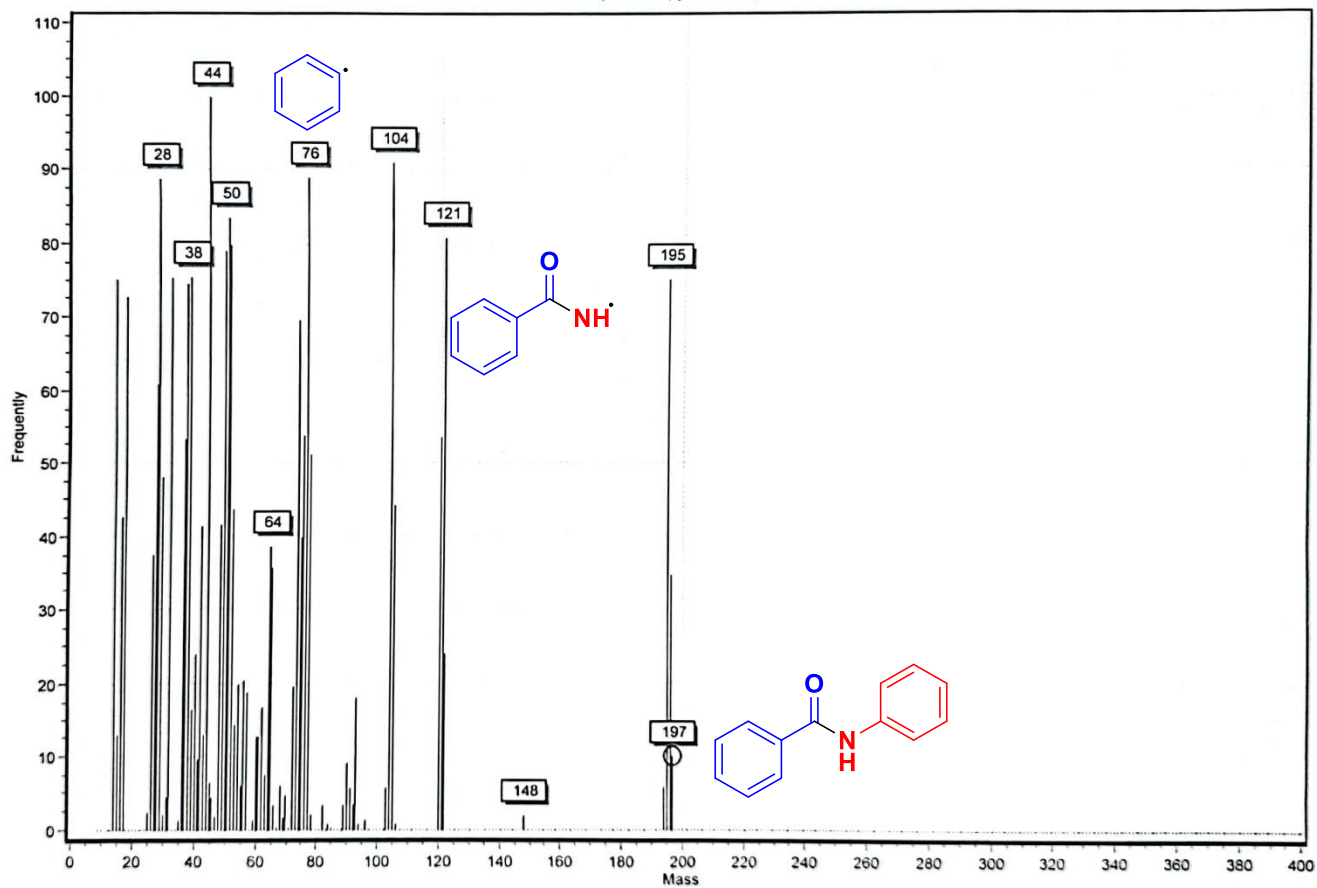
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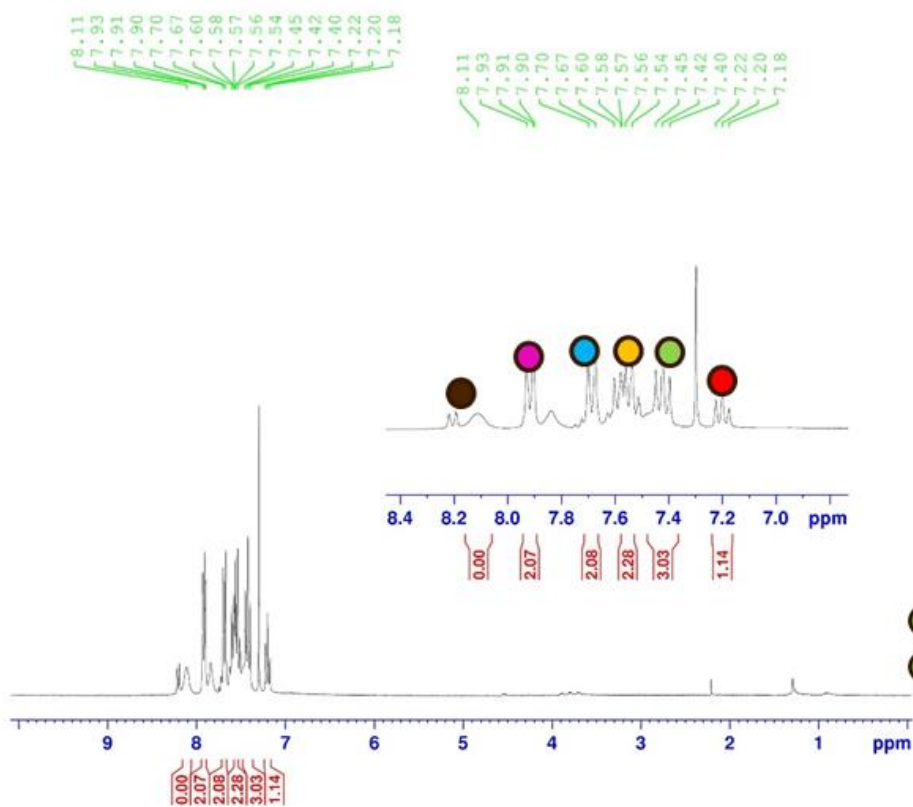
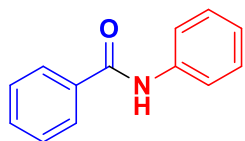
Mass spectroscopy of compound (1)



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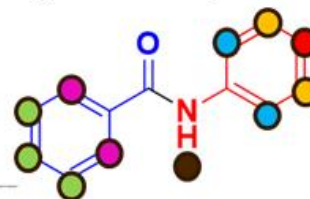


¹H NMR spectrum of compound (1)

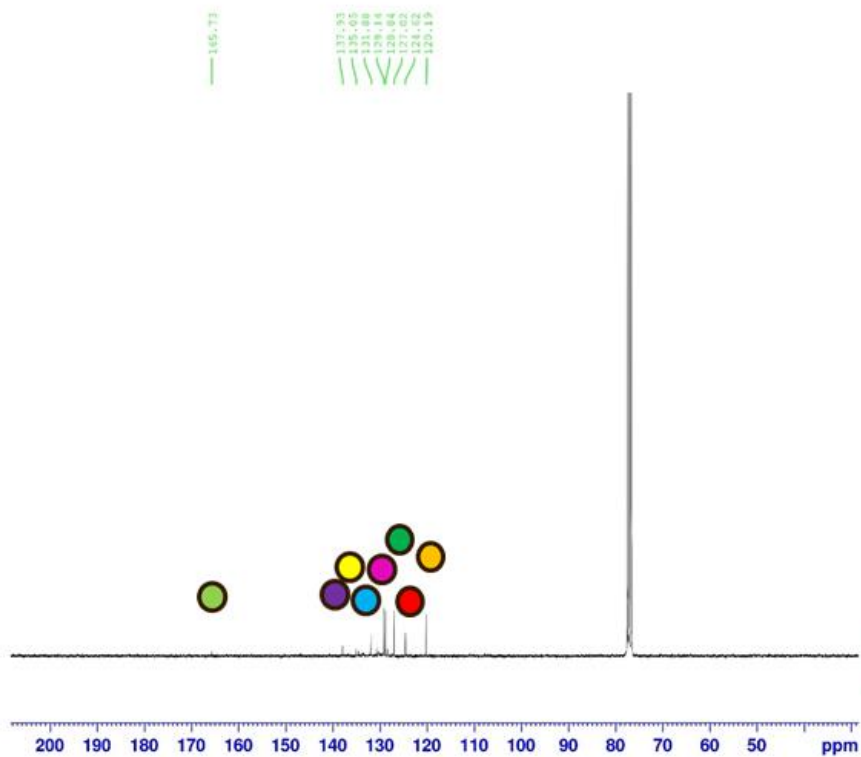
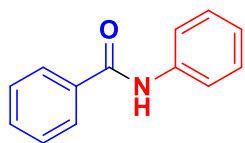


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TE 295.5 K
D1 1.00000000 sec
TD0 1

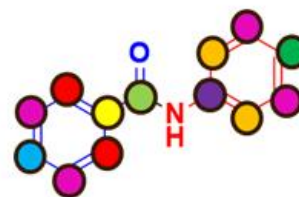


¹³C NMR spectrum of compound (1)

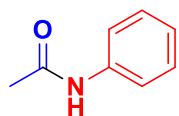


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PROCNO 1

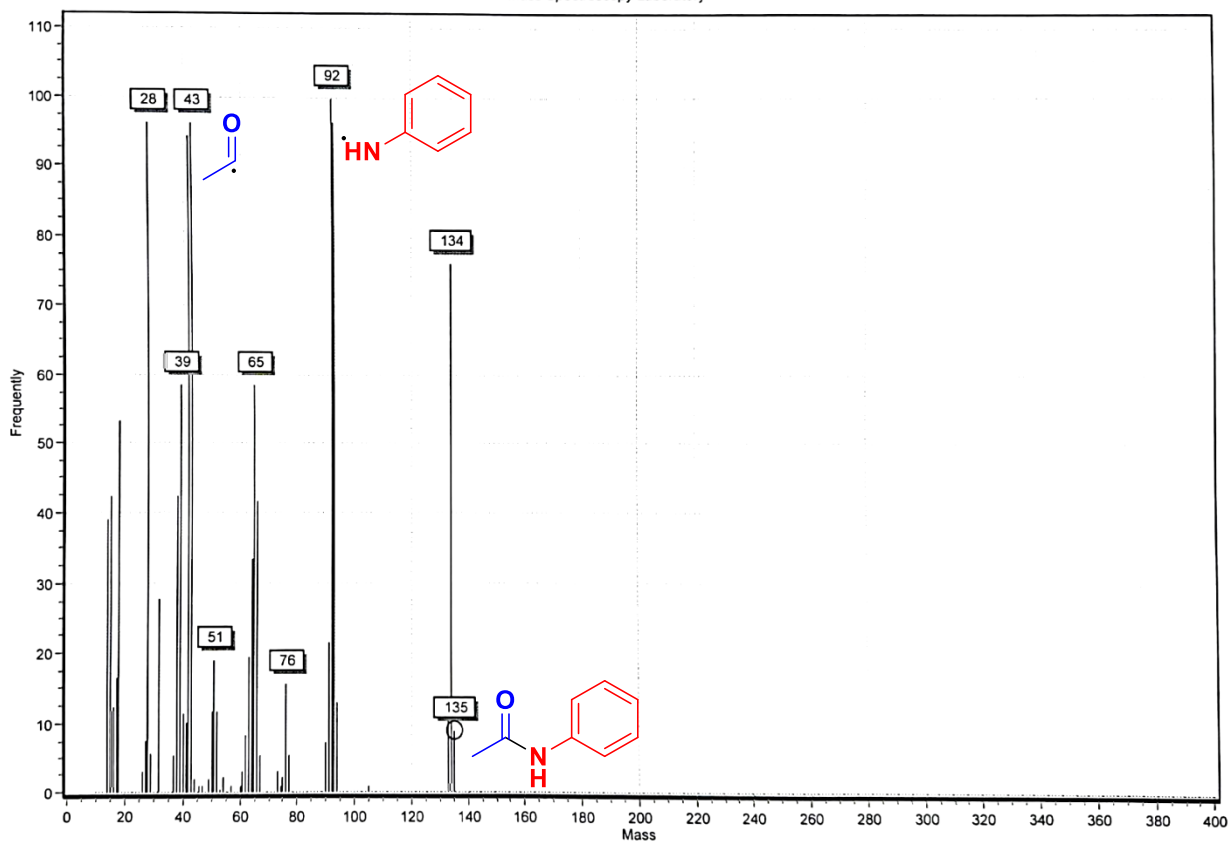
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FIDRES 0.276427 Hz
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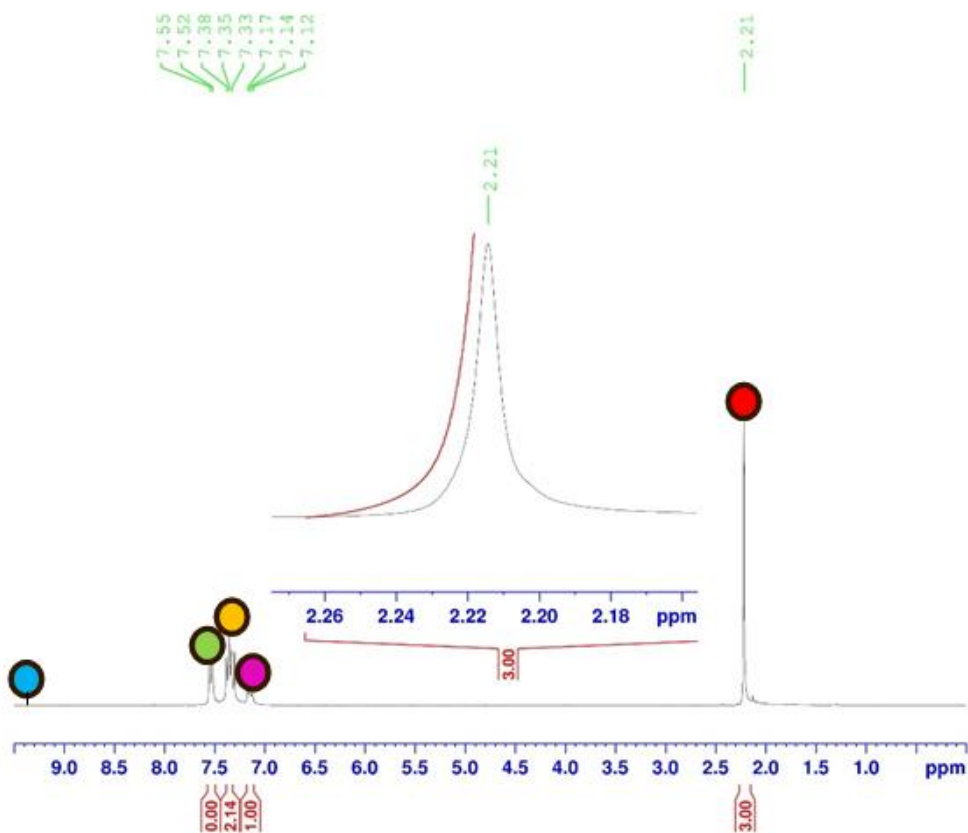
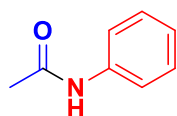
Mass spectroscopy of compound (2)



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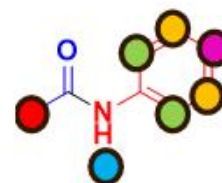


¹H NMR spectrum of compound (2)

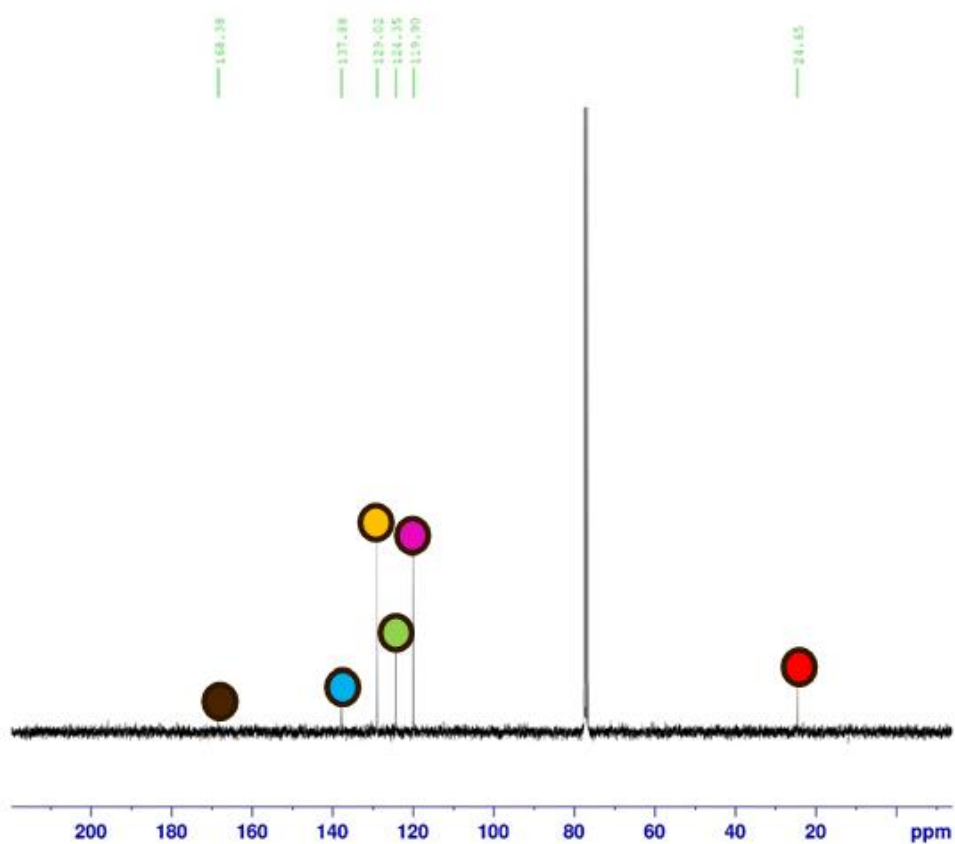
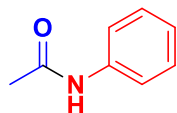


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SOLVENT CDCl3
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FIDRES 0.091699 Hz
AQ 5.4525952 sec
RG 202
DW 83.200 usec
DE 6.50 usec
TE 295.6 K
D1 1.00000000 sec
TDO 1

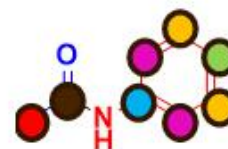


¹³C NMR spectrum of compound (2)

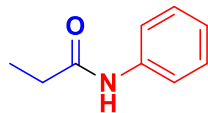


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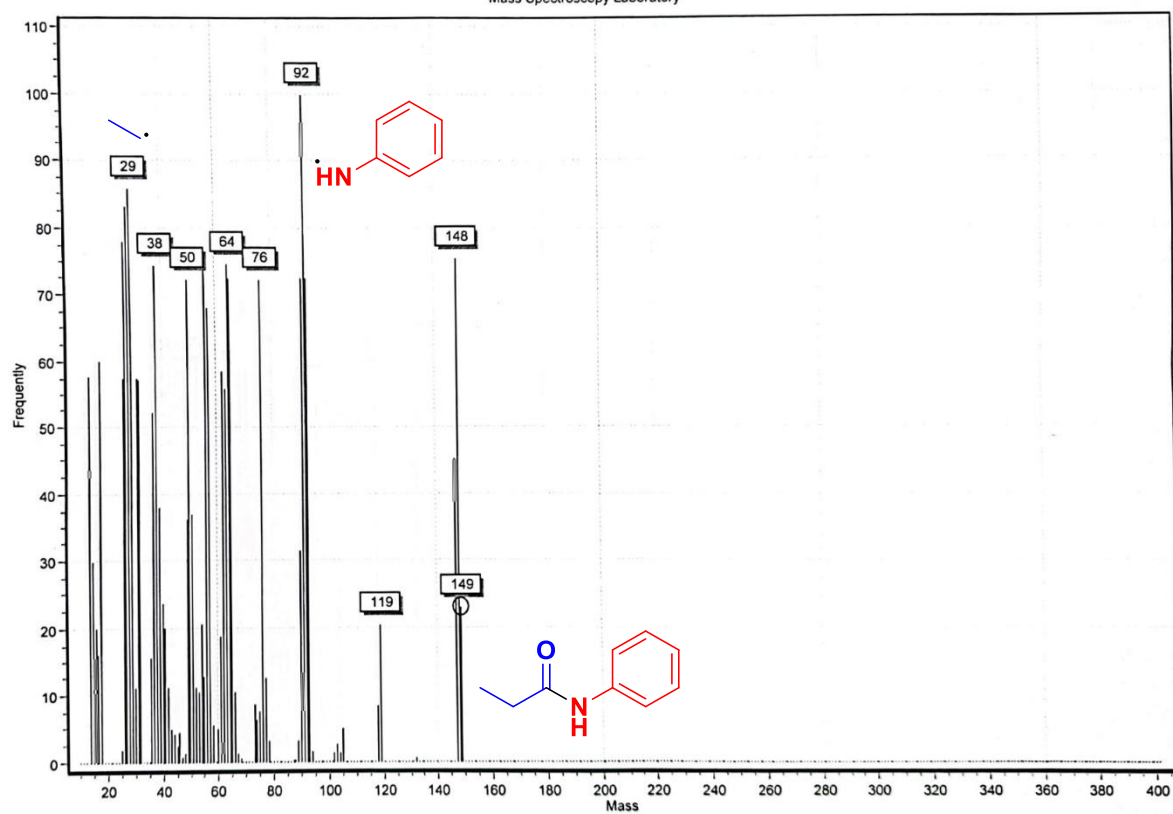
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TD 65536
SOLVENT CDCl3
NS 616
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SWH 18115.941 Hz
FIDRES 0.276427 Hz
AQ 1.8087935 sec
RG 202
DW 27.600 usec
DE 6.50 usec
TE 296.0 K
D1 2.0000000 sec
D11 0.0300000 sec
TDO 1



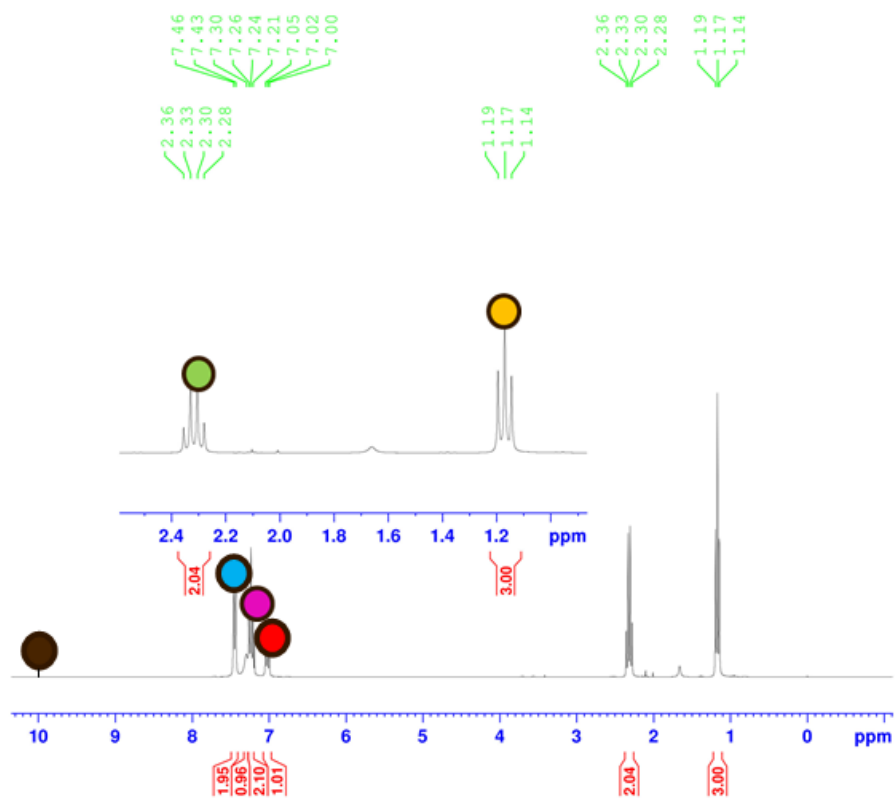
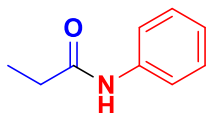
Mass spectroscopy of compound (3)



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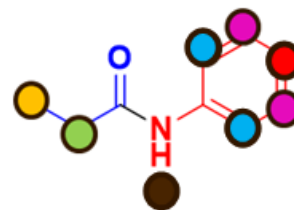


¹H NMR spectrum of compound (3)

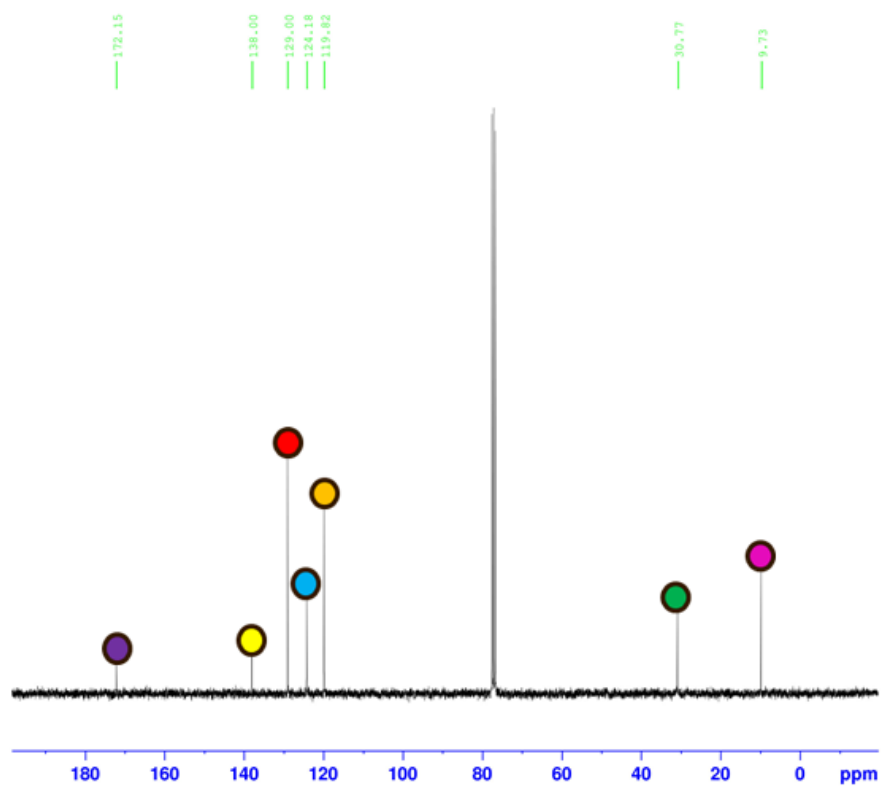
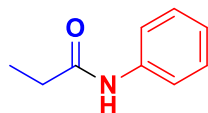


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 PULPROG zg30
 TD 24036
 SOLVENT CDC13
 NS 16
 DS 2
 SWH 6009.615 Hz
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 TDO 1

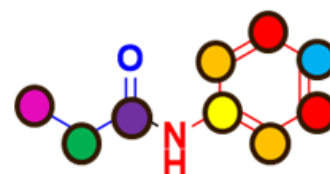


^{13}C NMR spectrum of compound (3)

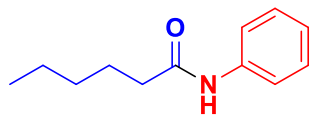


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NAME Bahman
EXPNO 532
PROCNO 1

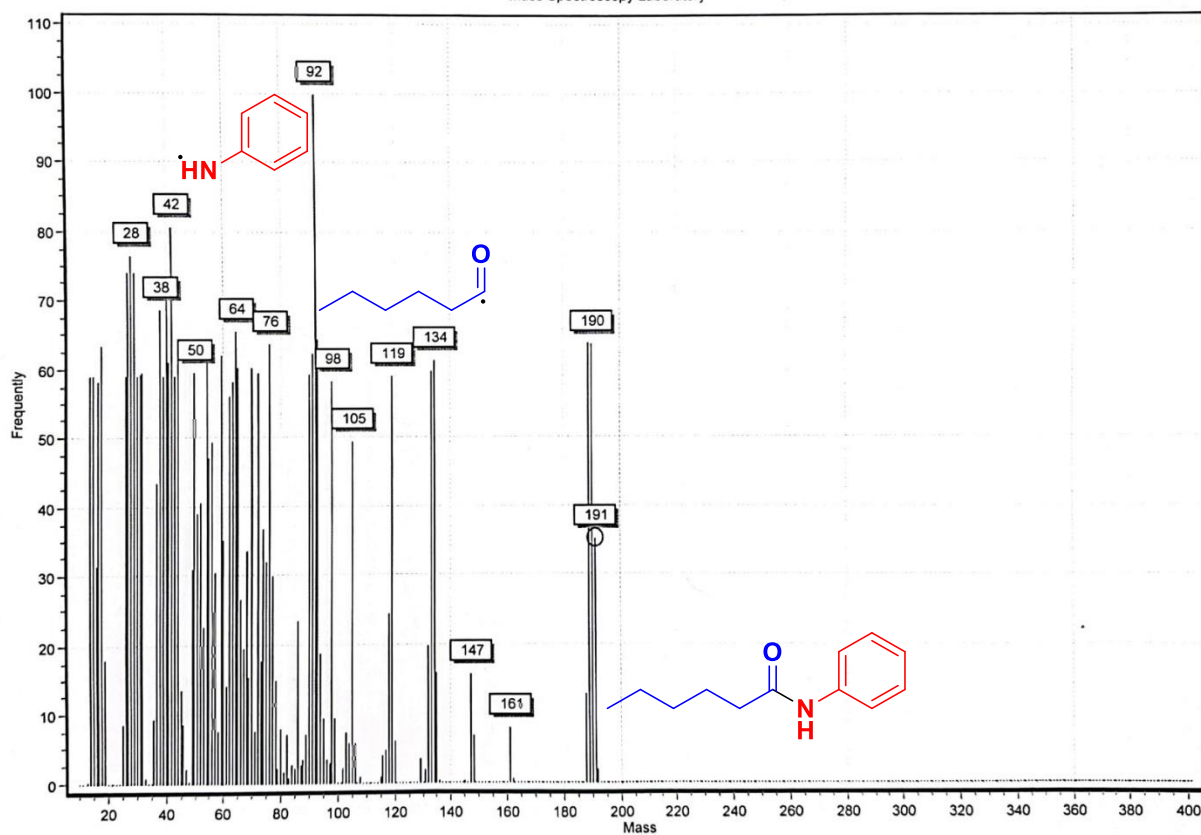
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NS 400
DS 4
SMH 18115.941 Hz
FIDRES 0.276427 Hz
AQ 1.8087935 sec
RG 202
DW 27.600 usec
DE 6.50 usec
TE 294.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1



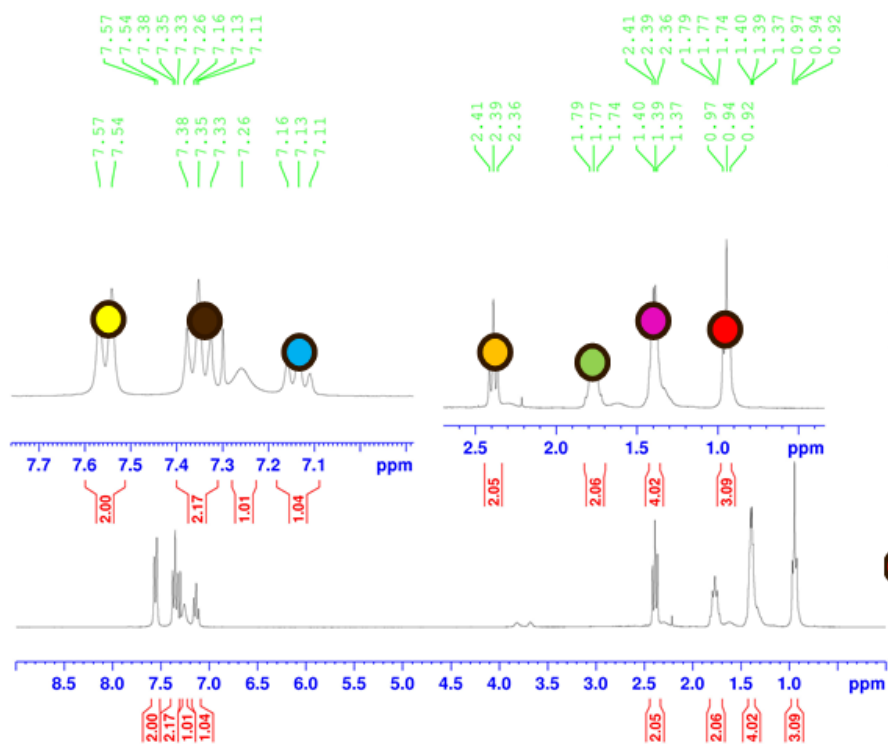
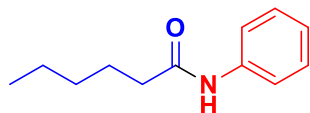
Mass spectroscopy of compound (4)



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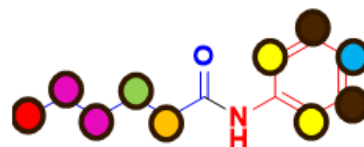


¹H NMR spectrum of compound (4)

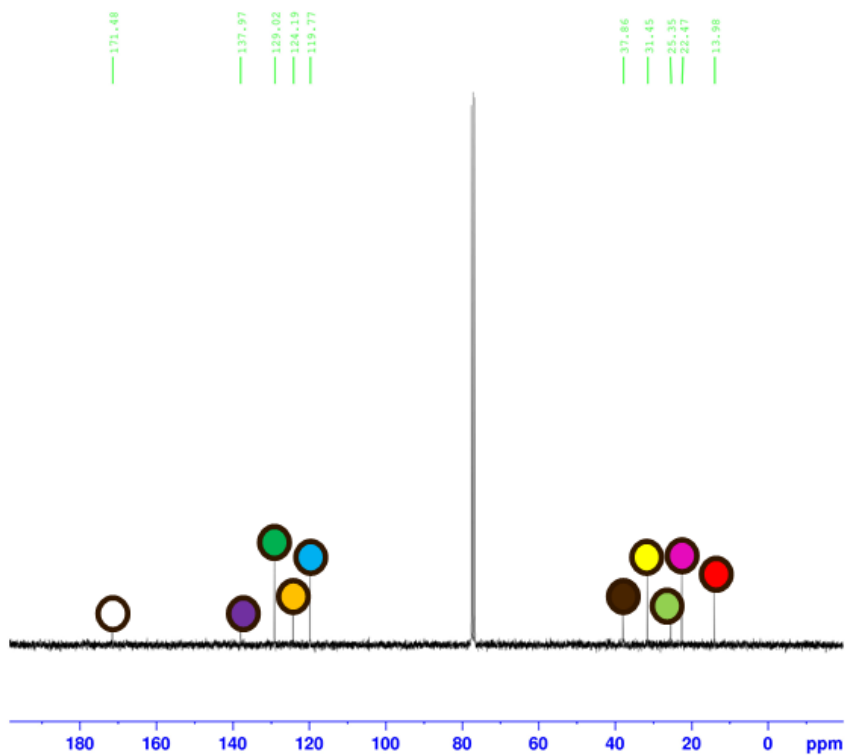
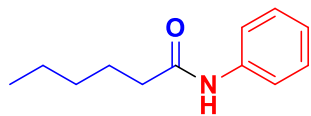


Current Data Parameters
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 EXPNO 534
 PROCNO 1

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 PULPROG zg30
 TD 24036
 SOLVENT CDCl3
 NS 32
 DS 2
 SWH 6009.615 Hz
 FIDRES 0.250026 Hz
 AQ 1.9997952 sec
 RG 181.36
 DW 83.200 usec
 DE 6.50 usec
 TE 293.5 K
 D1 1.00000000 sec
 TDO 1



^{13}C NMR spectrum of compound (4)

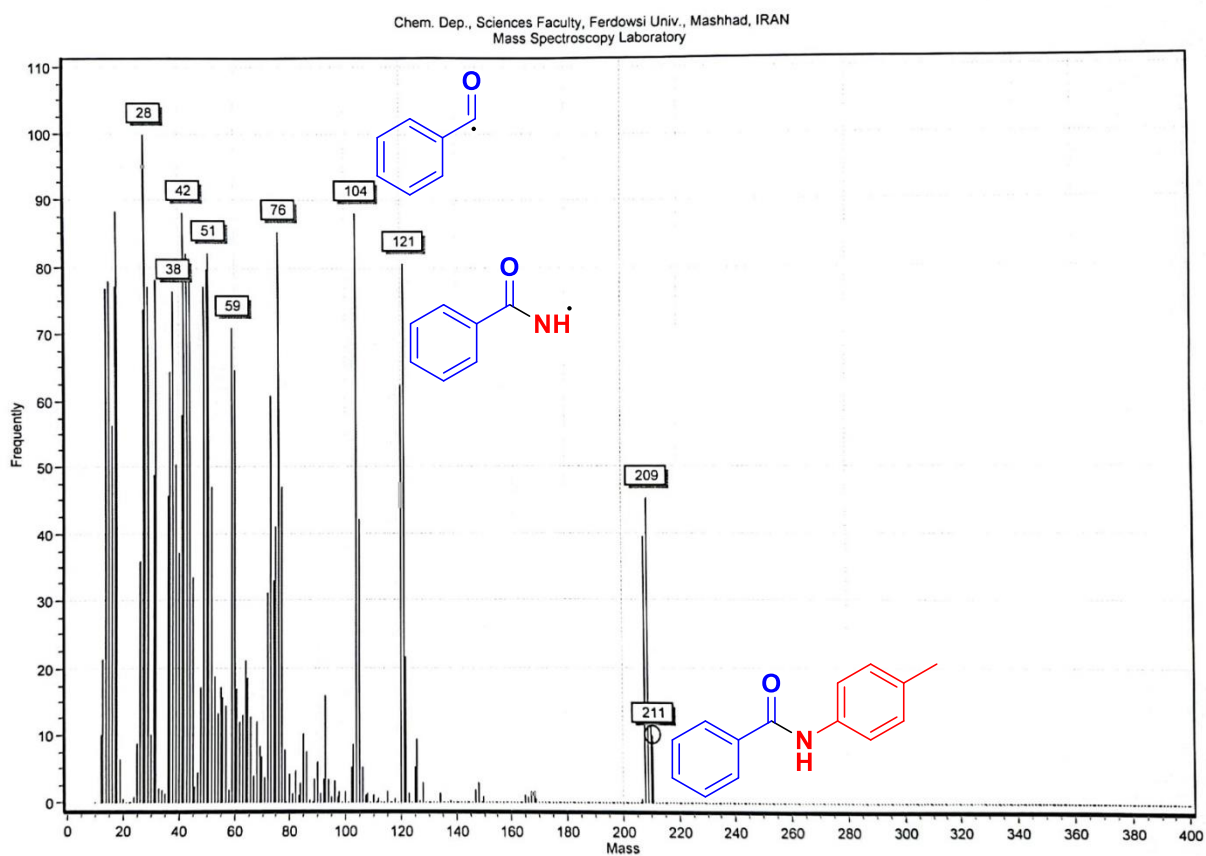
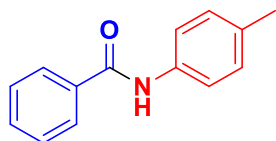


Current Data Parameters
NAME Bahman
EXPNO 535
PROCNO 1

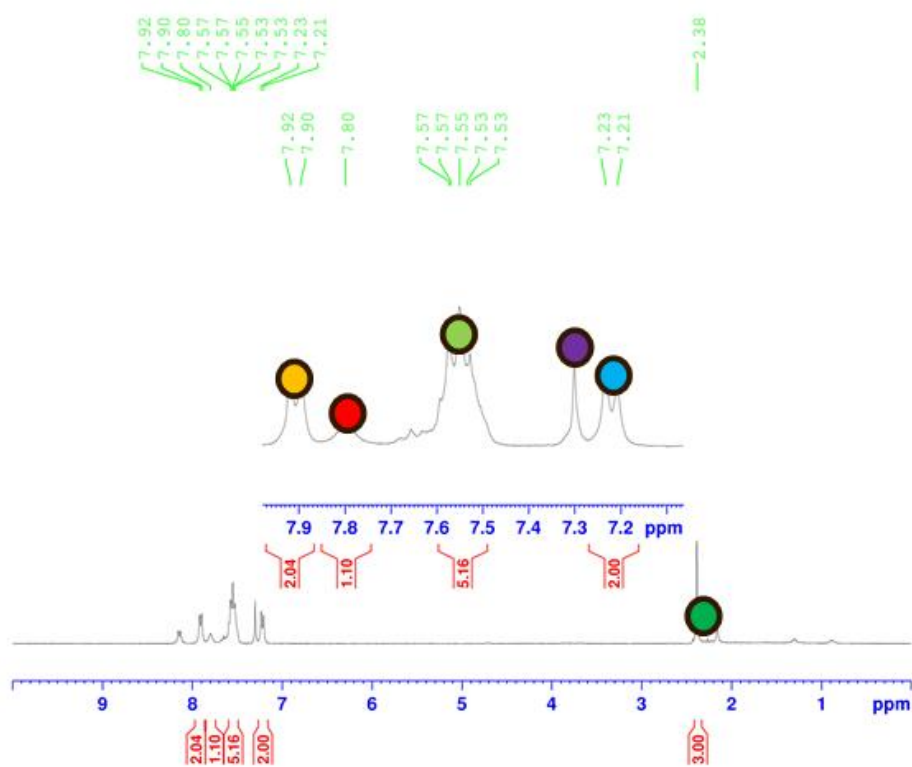
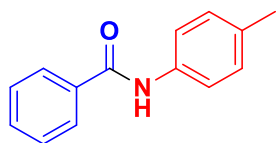
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SOLVENT CDCl3
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SWH 1815.941 Hz
FIDRES 0.276427 Hz
AQ 1.8087935 sec
RG 202
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DE 6.50 usec
TE 294.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1



Mass spectroscopy of compound (5)



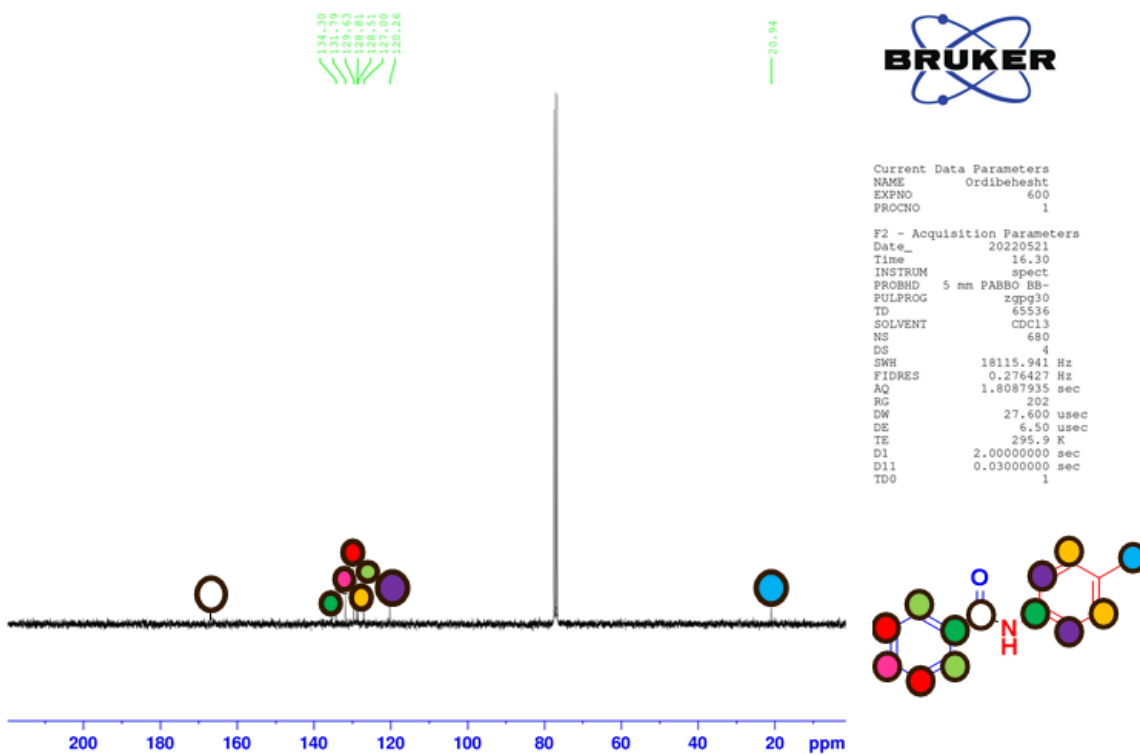
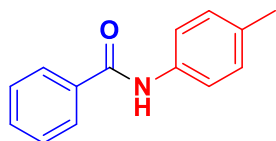
^1H NMR spectrum of compound (5)



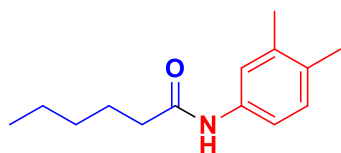
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TD 65536
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DS 2
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FIDRES 0.091699 Hz
AQ 5.4525952 sec
RG 202
DW 83.200 usec
DE 6.50 usec
TE 295.6 K
D1 1.00000000 sec
TD0 1

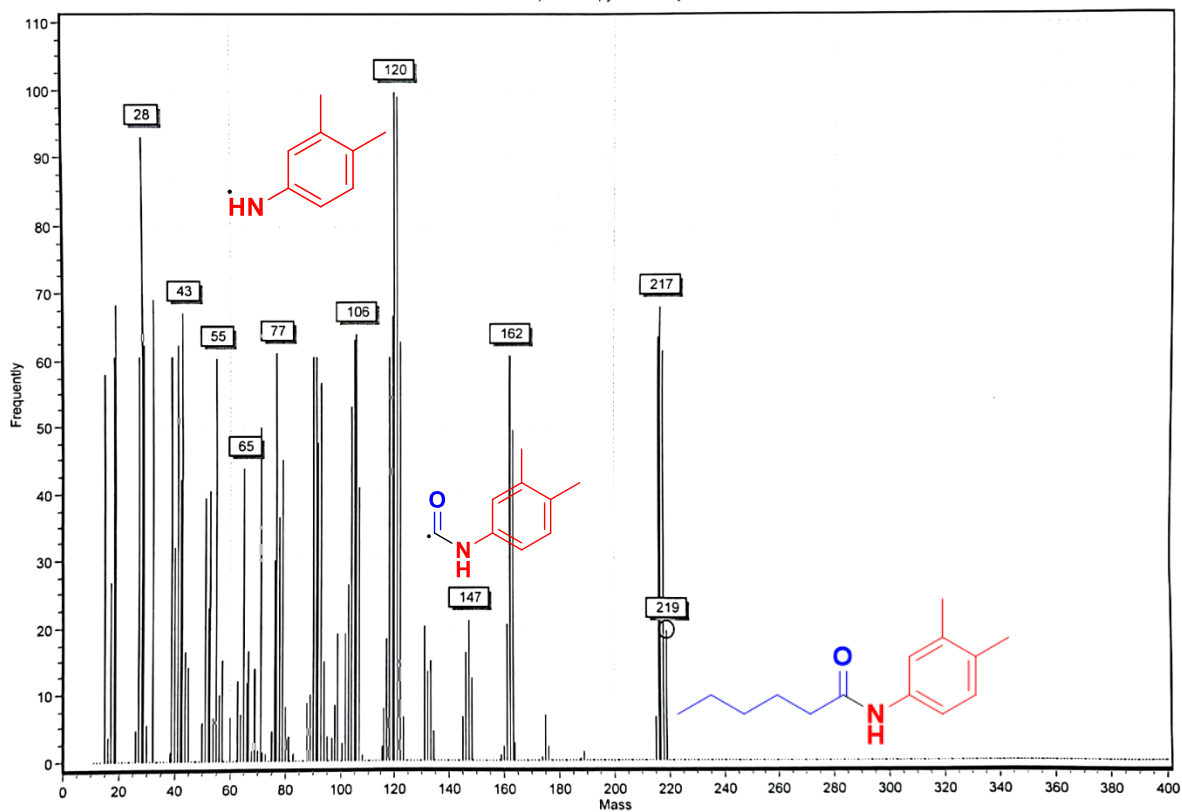
^{13}C NMR spectrum of compound (5)



Mass spectroscopy of compound (14)

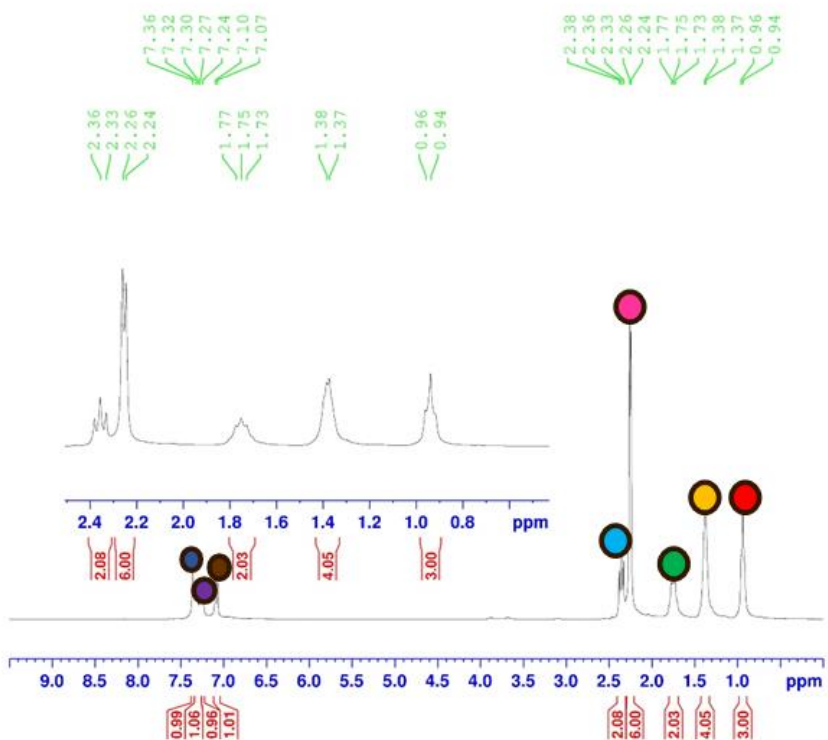
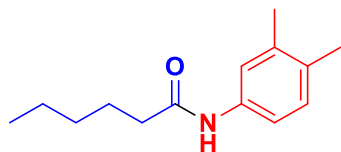


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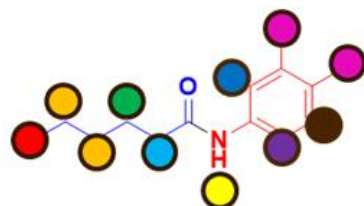
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¹H NMR spectrum of compound (14)

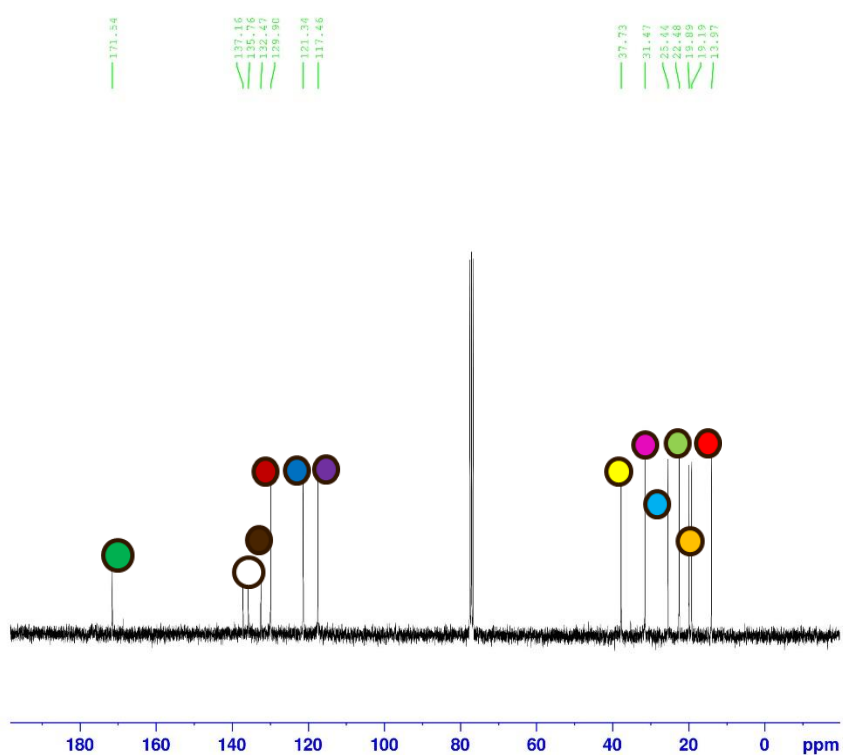
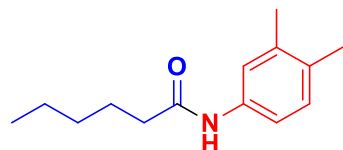


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 PROCNO 1

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 SOLVENT CDCl3
 NS 32
 DS 2
 SWH 6009.615 Hz
 FIDRES 0.091699 Hz
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 RG 113.32
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 DE 6.50 usec
 TE 295.6 K
 DL 1.00000000 sec
 TDO 1

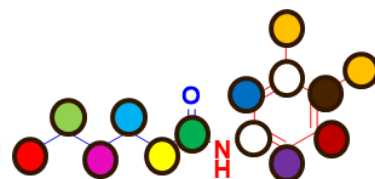


¹³C NMR spectrum of compound (14)

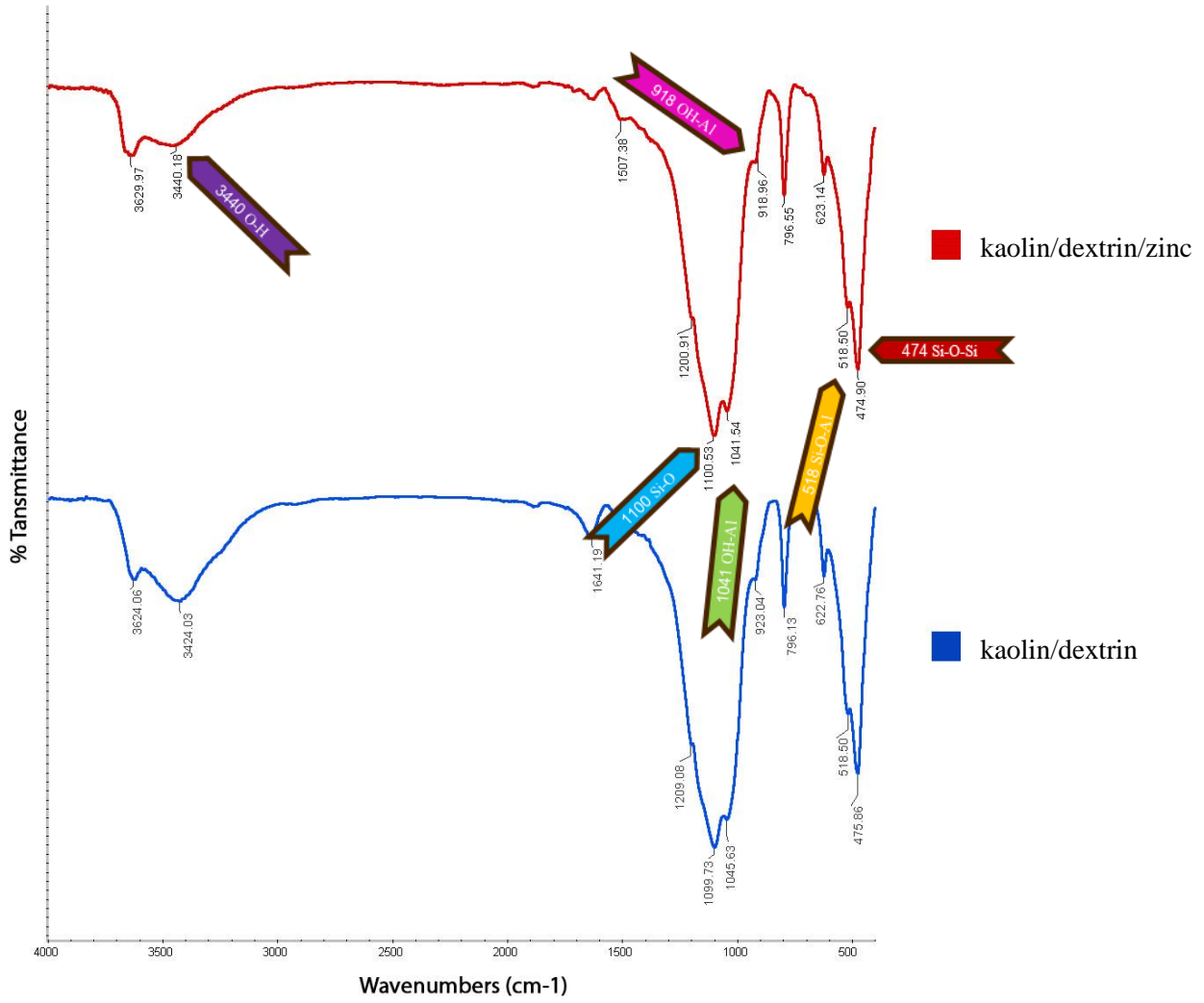


Current Data Parameters
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EXPNO 479
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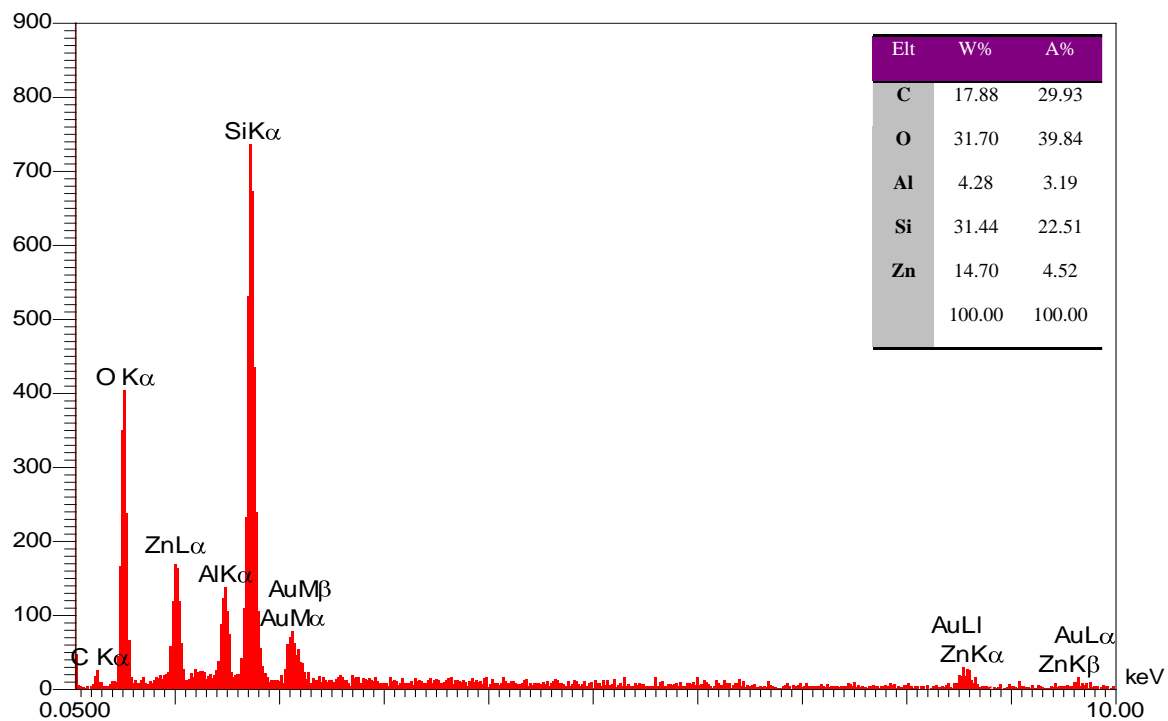
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FIDRES 0.276427 Hz
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RG 202
DW 27.600 usec
DE 6.50 usec
TE 296.4 K
D1 2.0000000 sec
D11 0.0300000 sec
TDO 1



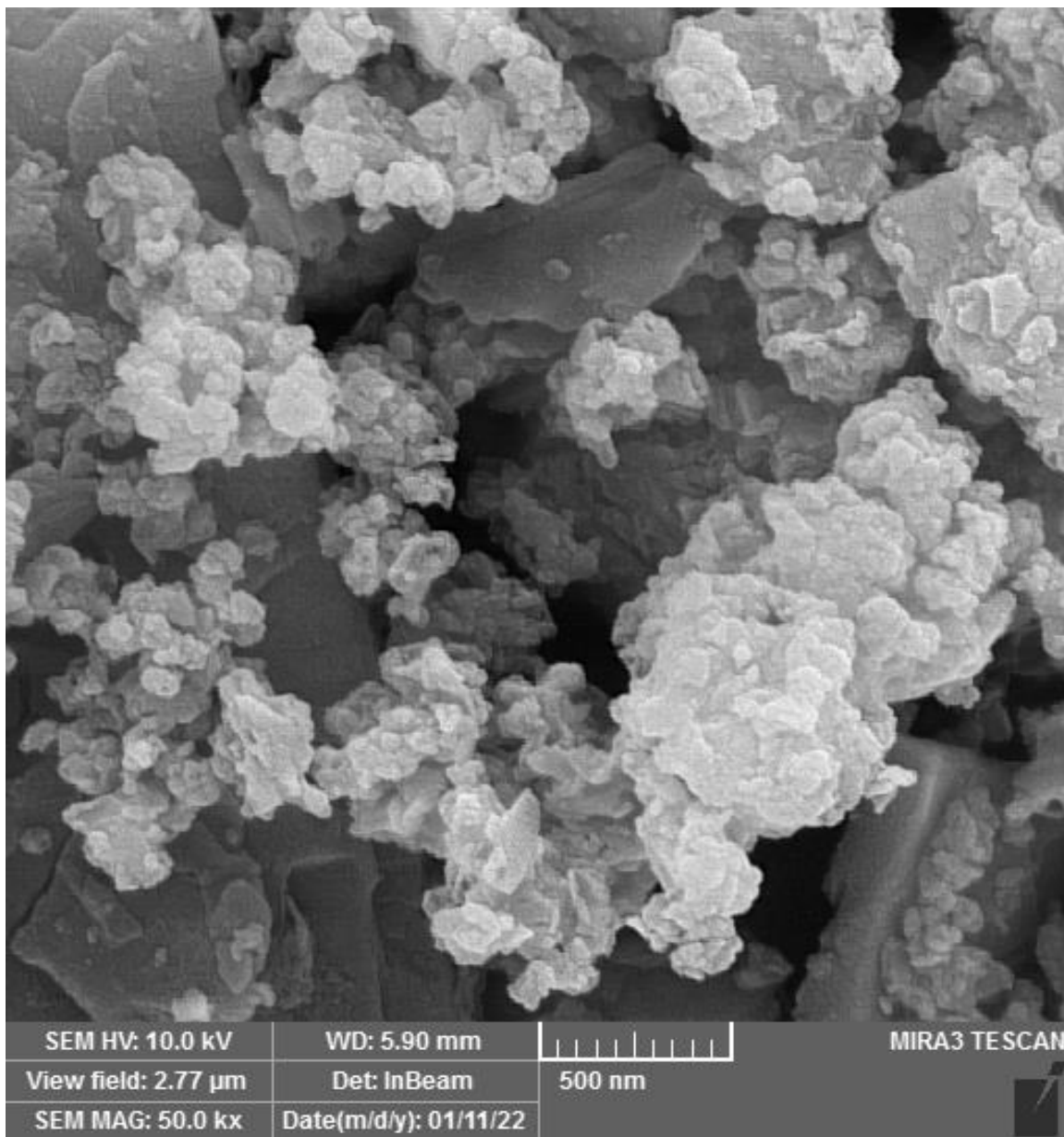
FT-IR spectrum of a blue courier related kaolin/dextrin, red courier related to kaolin/dextrin/zinc.



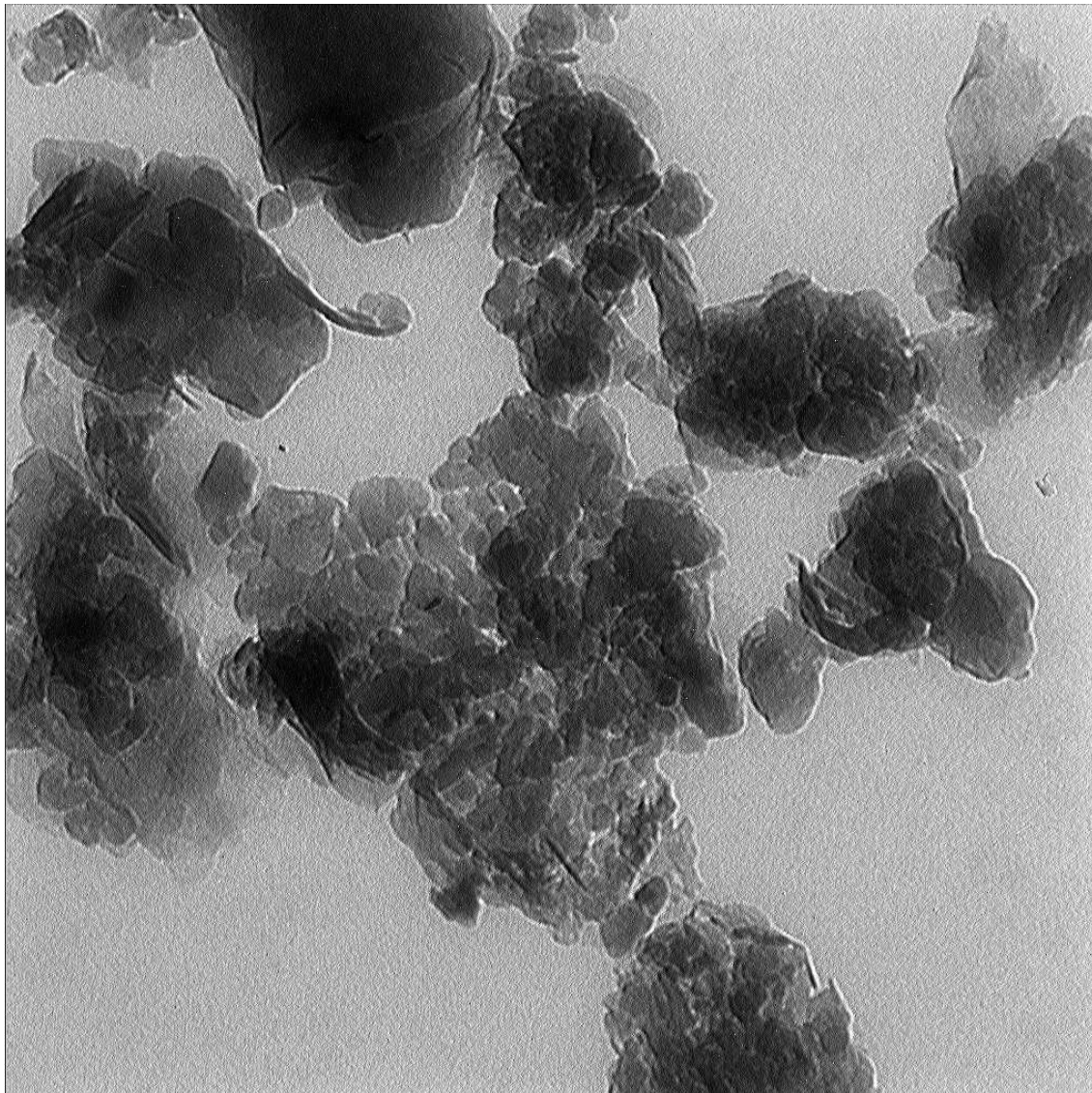
Energy-dispersive X-ray spectroscopy for kaolin/dextrin/zinc catalyst.



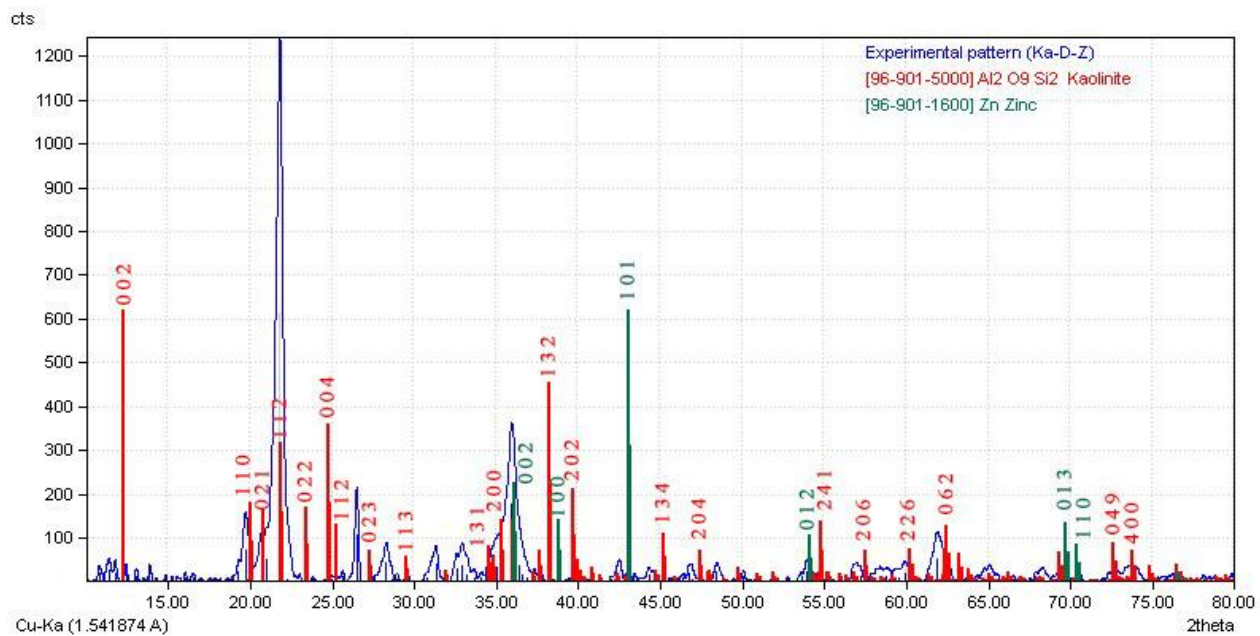
Scanning electron microscopy (SEM) for kaolin/dextrin/zinc.



Transmission electron microscopy (TEM) for kaolin/dextrin/zinc.



X-ray diffraction spectroscopy for kaolin/dextrin/zinc.



Thermogravimetric analysis of kaolin/dextrin/zinc.

