

FIGURE 1

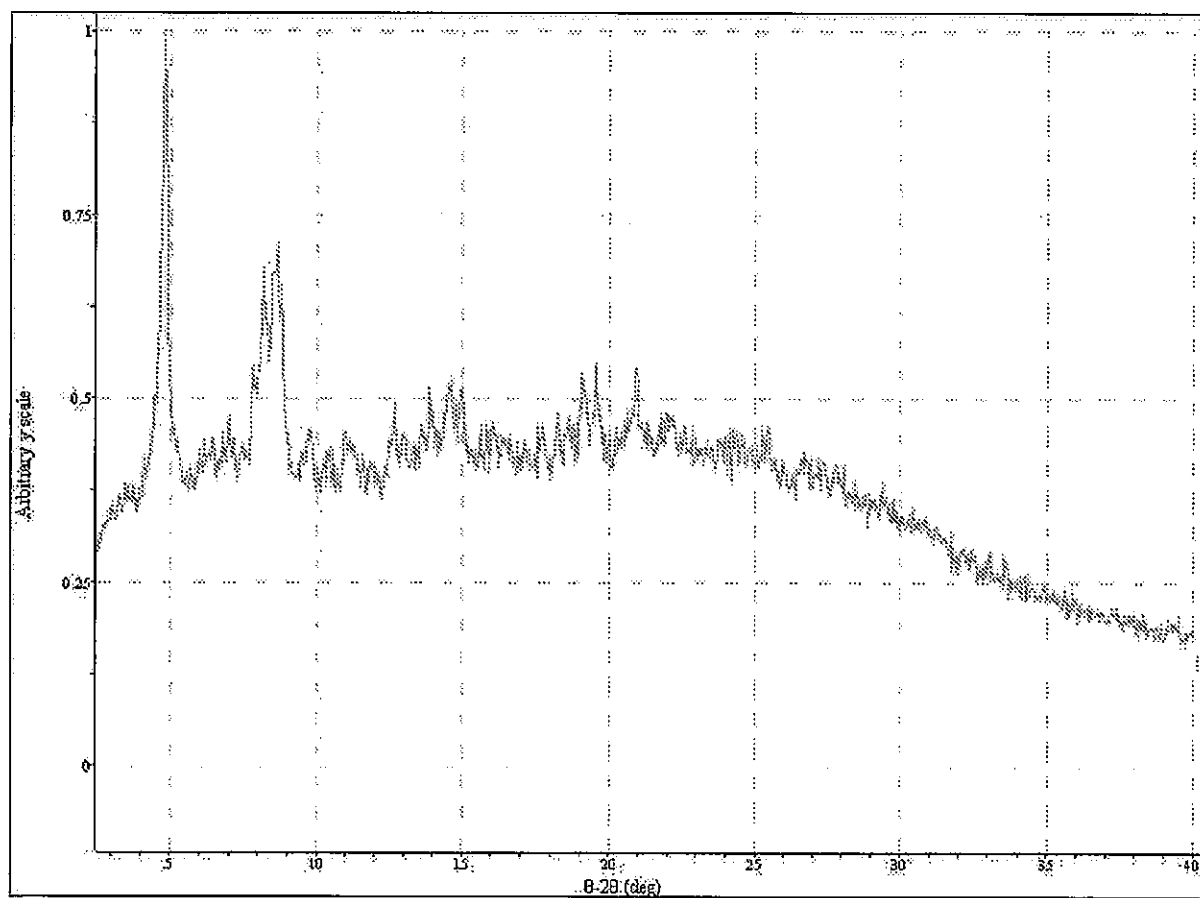
XRPD Pattern of Rifaximin Form γ -1 (ζ)

FIGURE 2

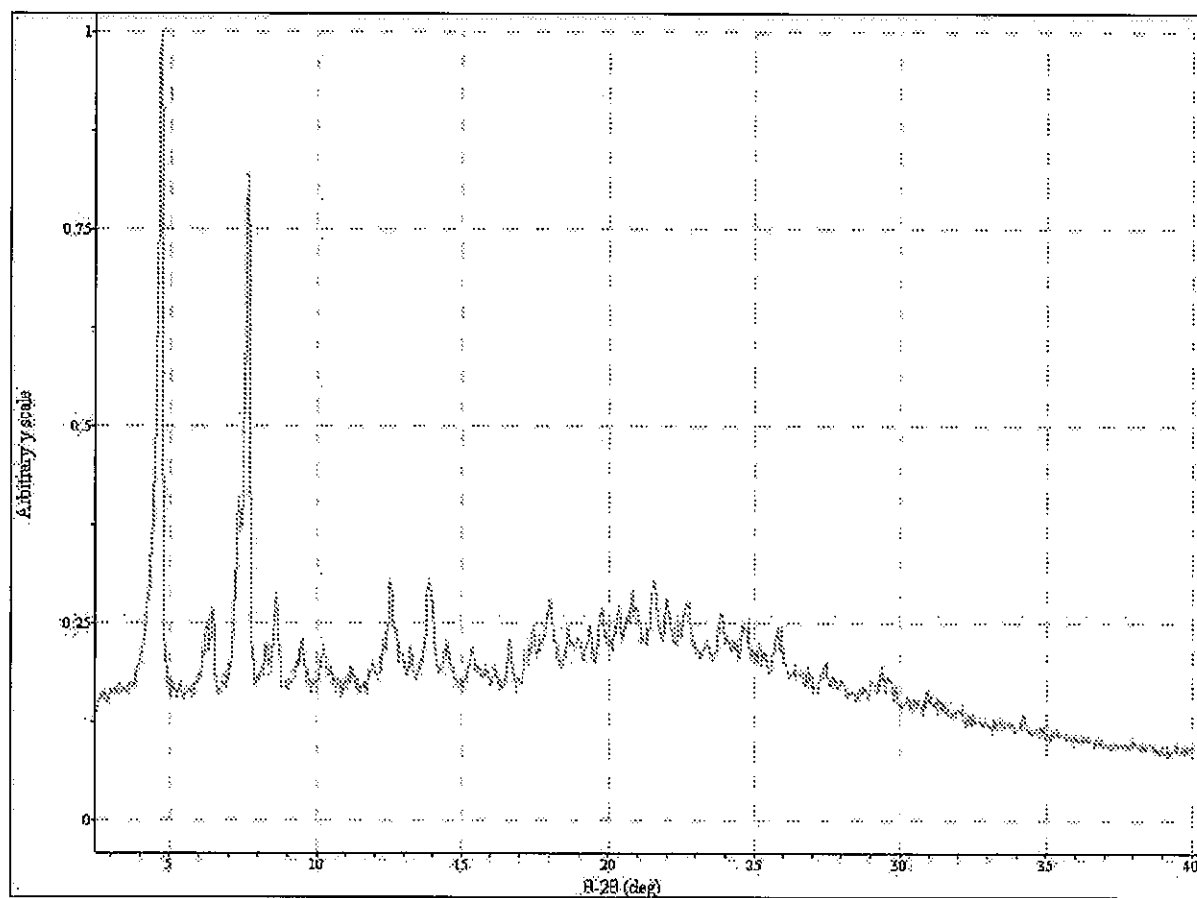
XRPD Pattern of Rifaximin Form ζ 

FIGURE 3

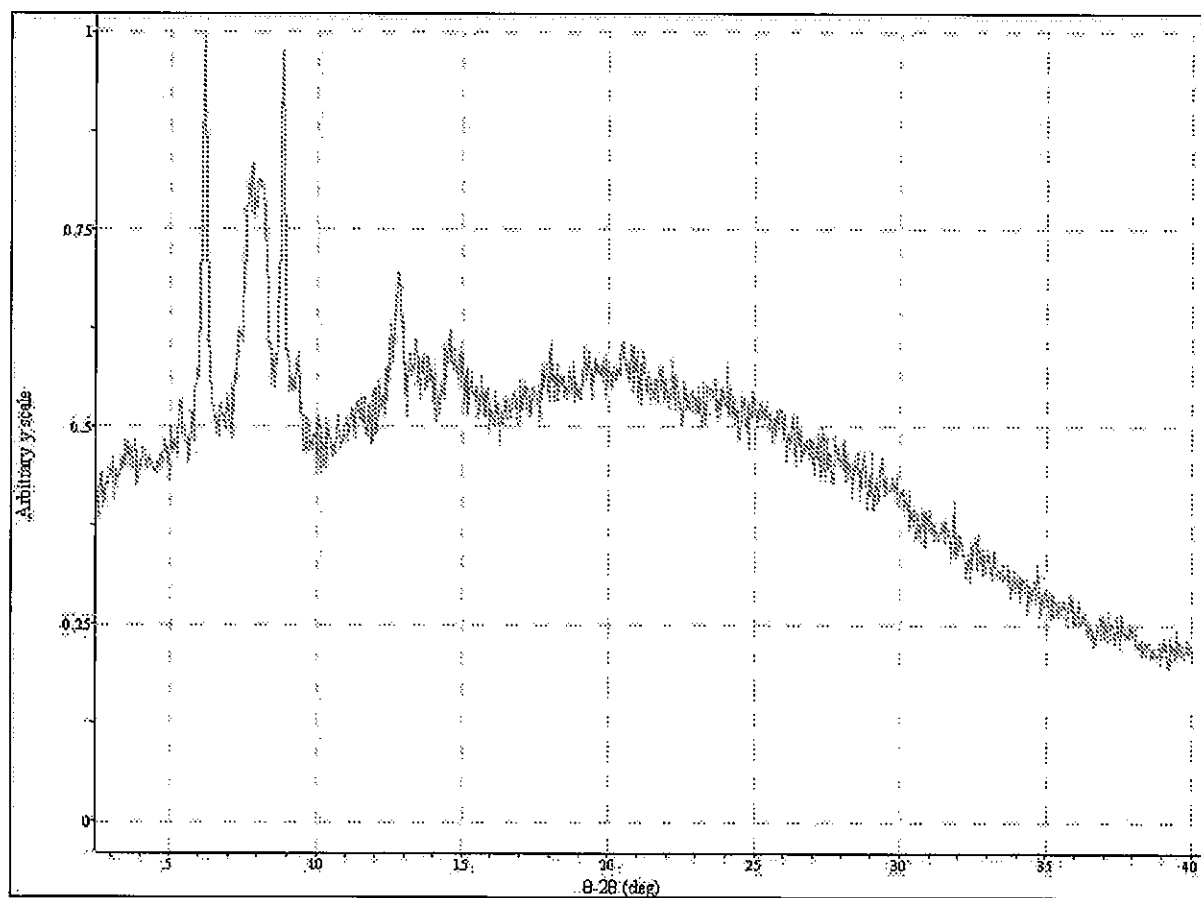
XRPD Pattern of Rifaximin Form η 

FIGURE 4

XRPD Pattern of Rifaximin Form Amorphous

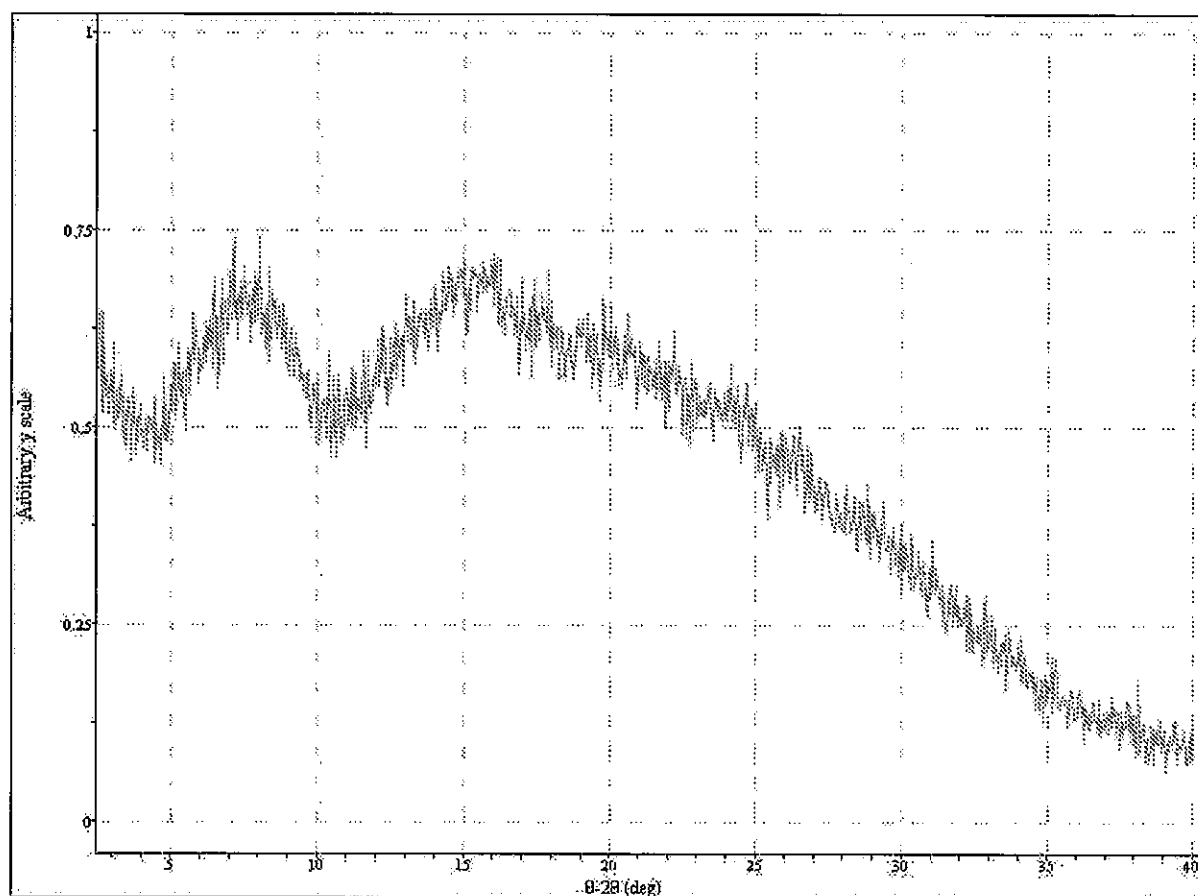


FIGURE 5

TGA and DSC of Rifaximin Amorphous

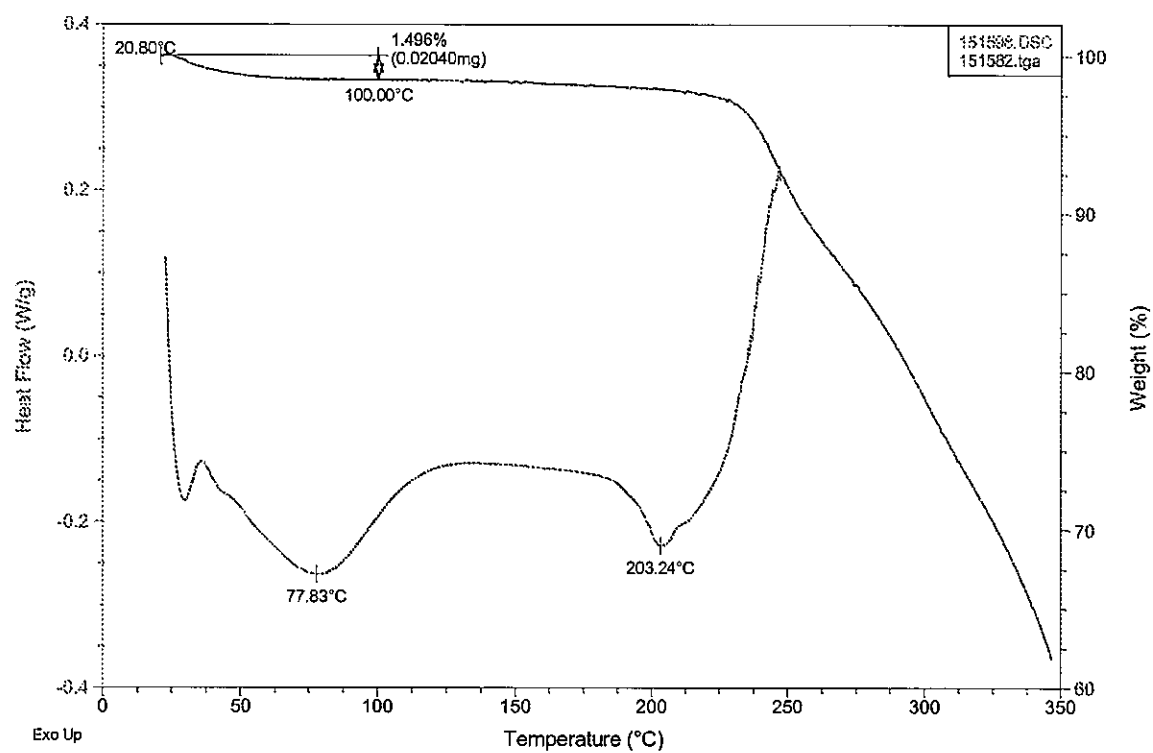
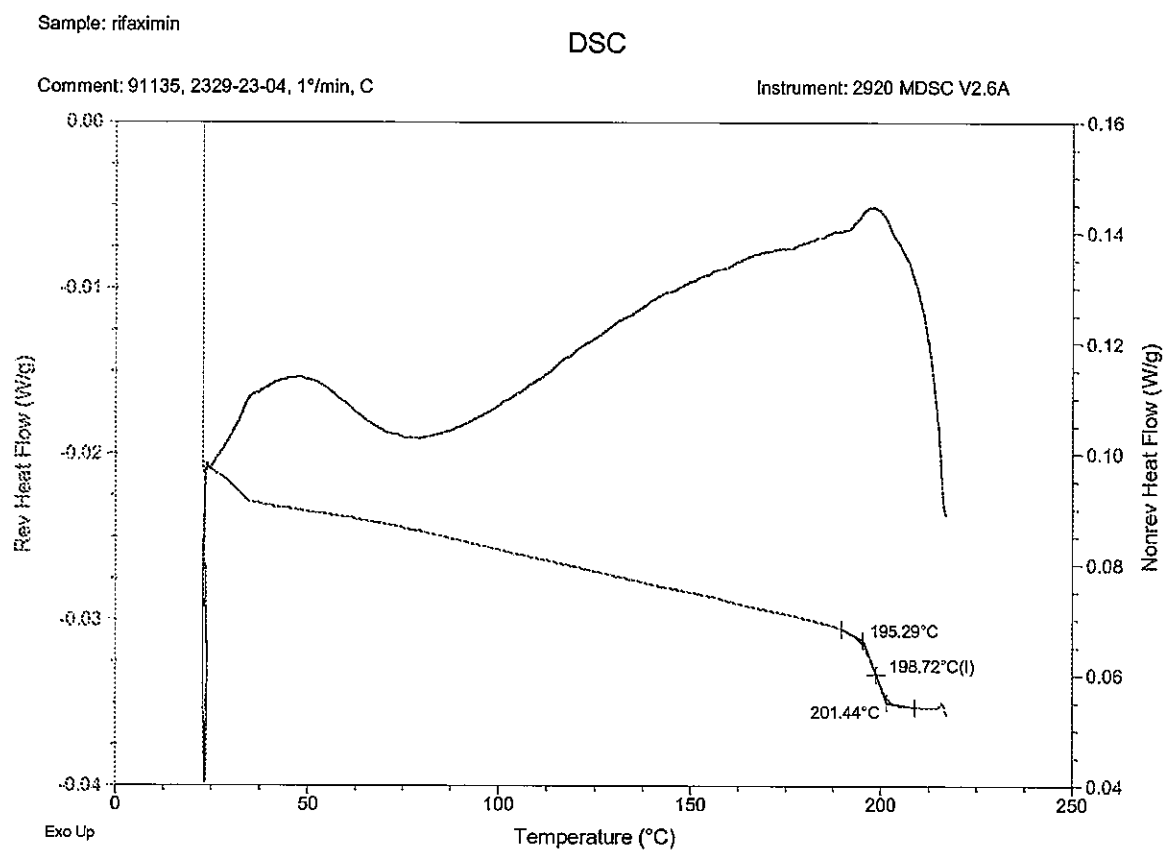


FIGURE 6

MDSC Rifaximin Form Amorphous



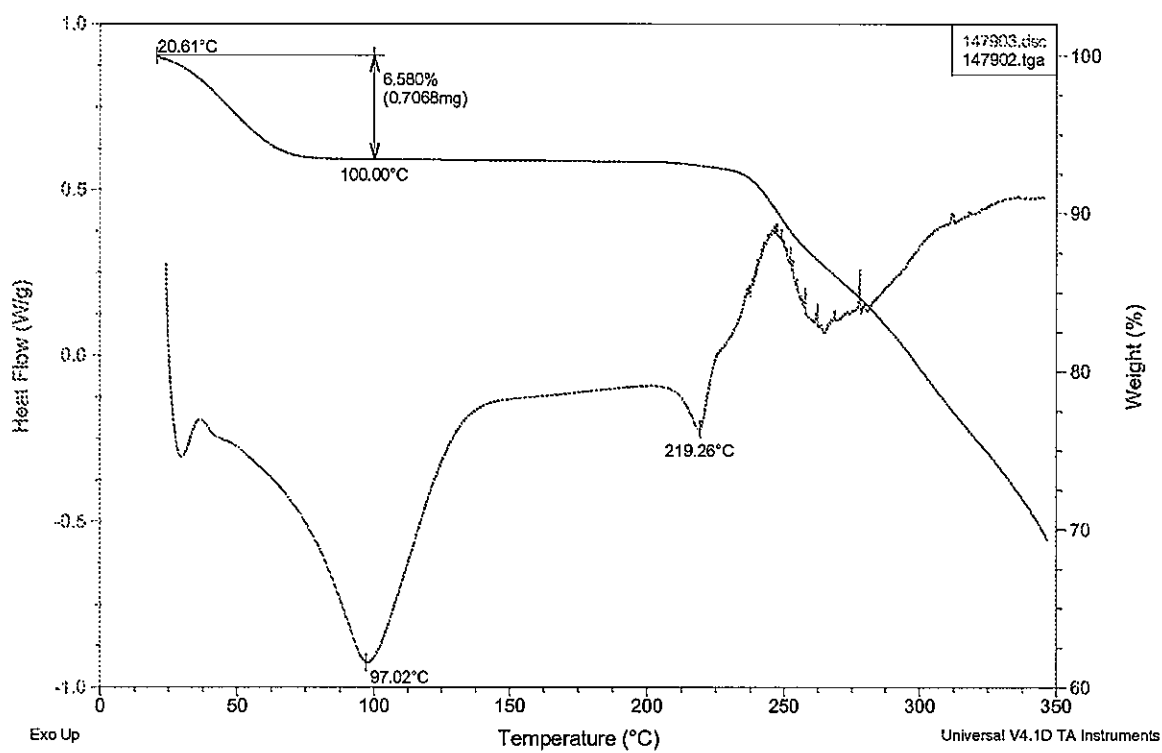
TGA and DSC of Rifaximin form β -2

FIGURE 7

FIGURE 8

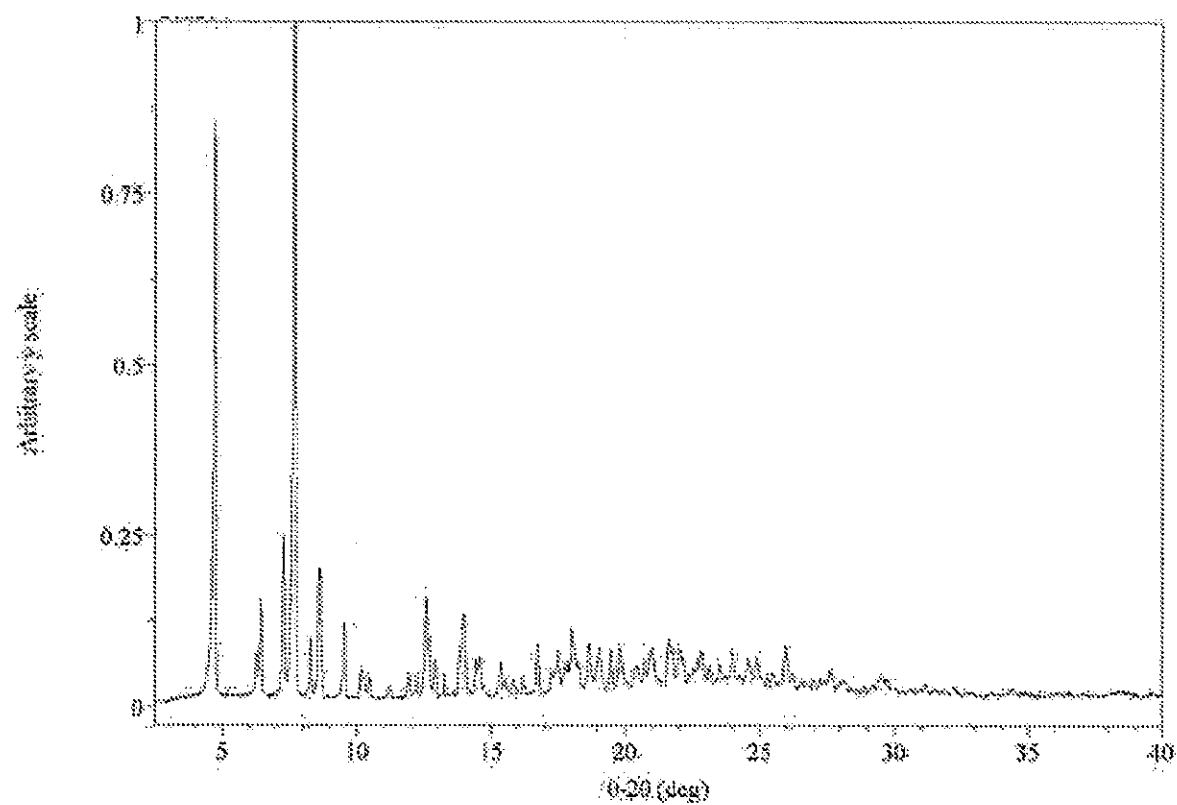


FIGURE 9

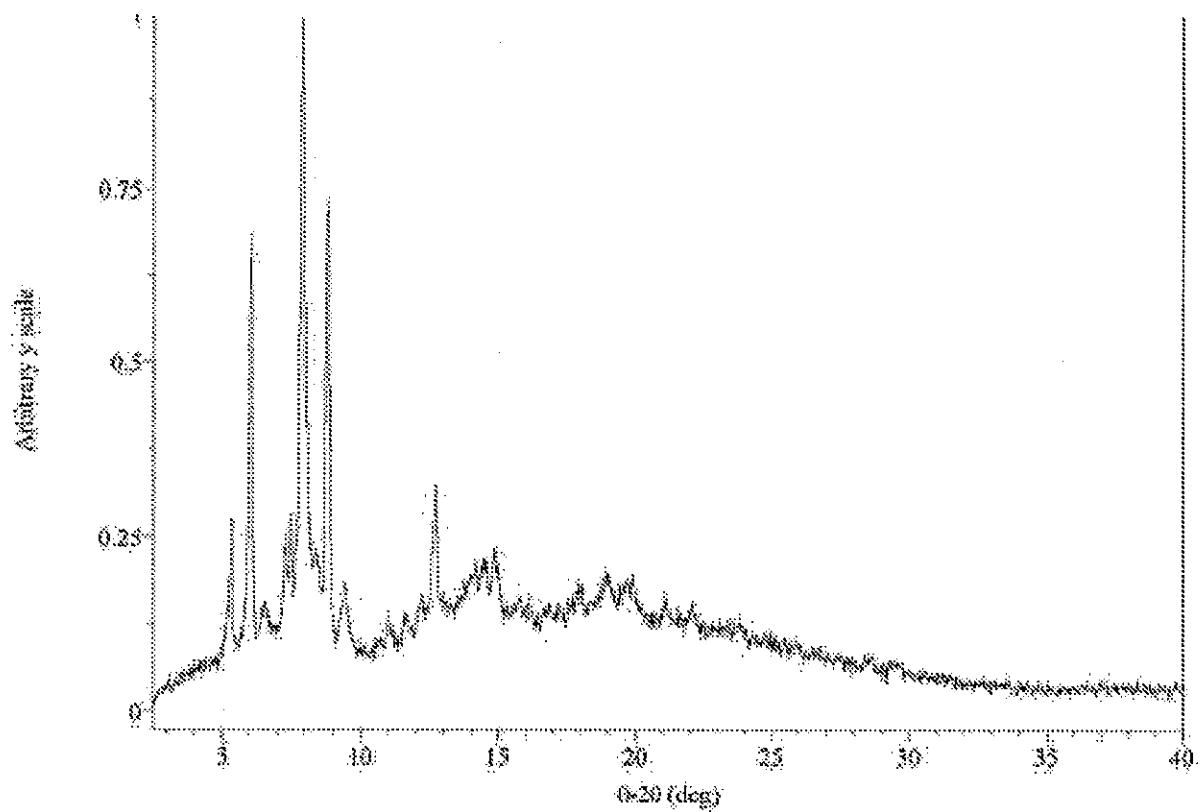


FIGURE 10

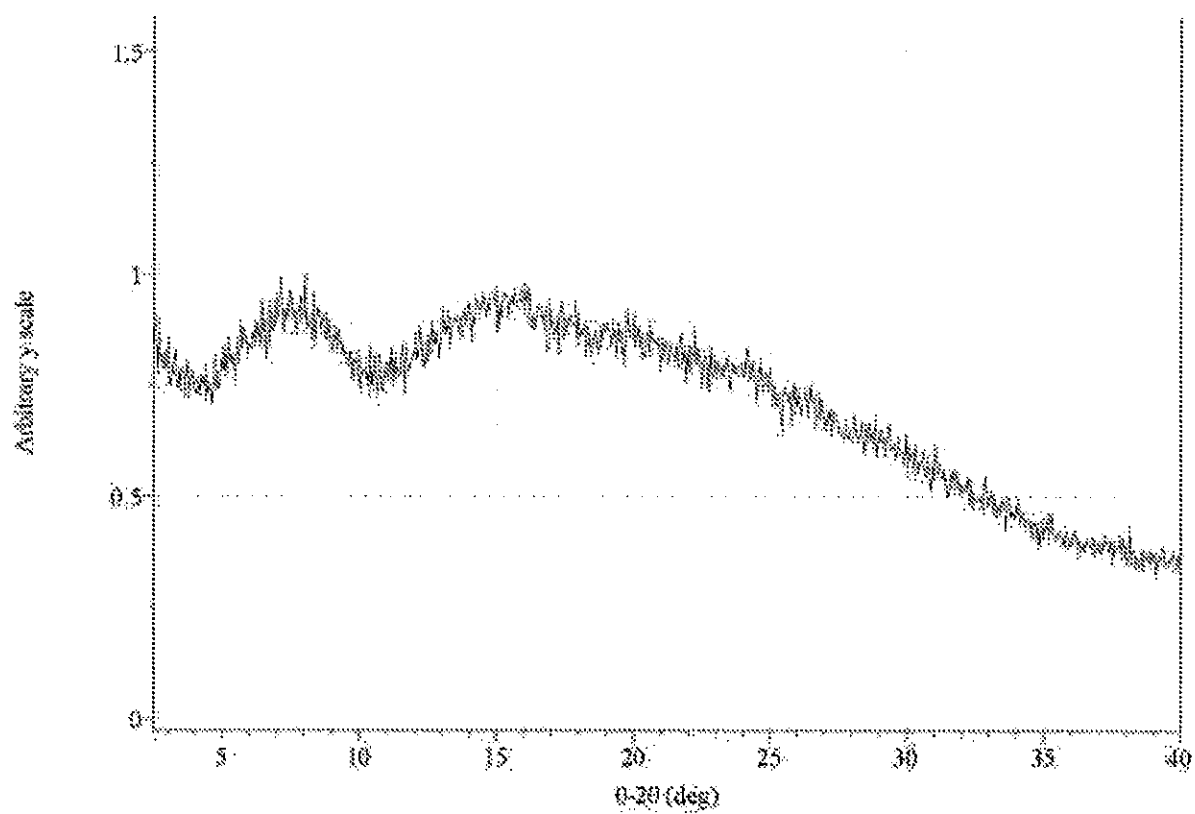


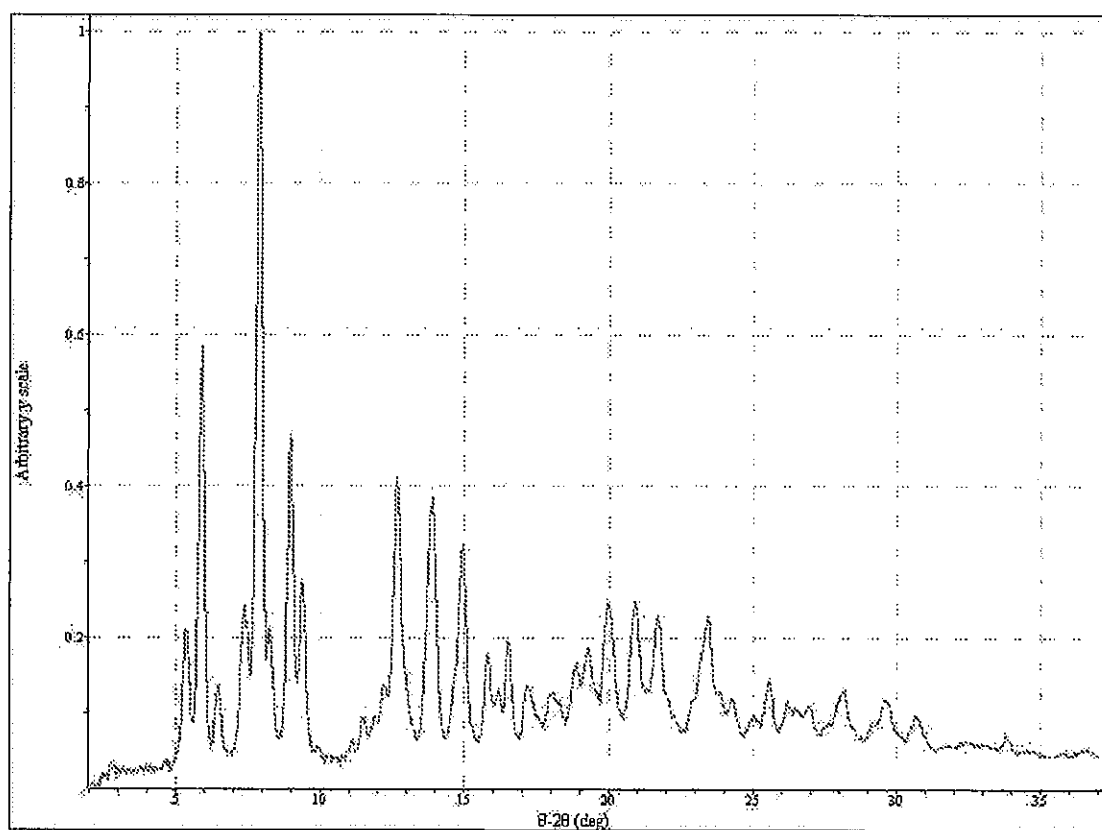
Figure 11**XRPD pattern of Rifaximin, Form Iota.**

Figure 12

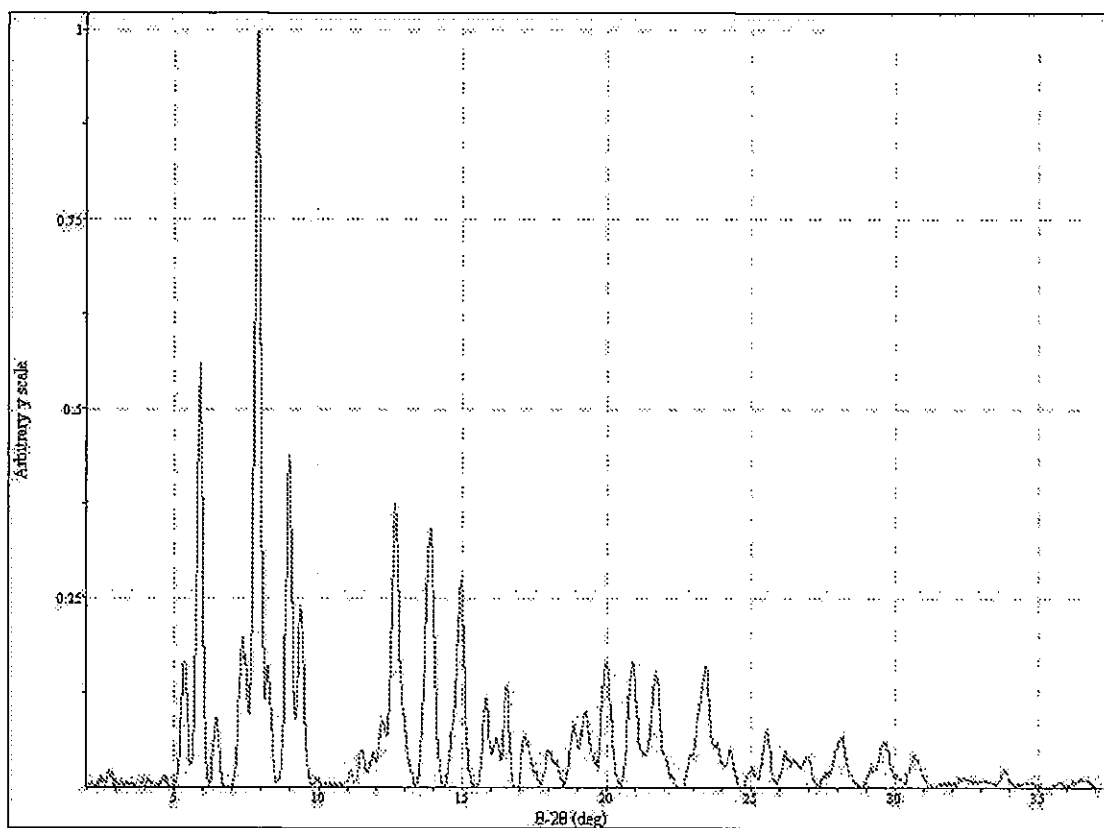
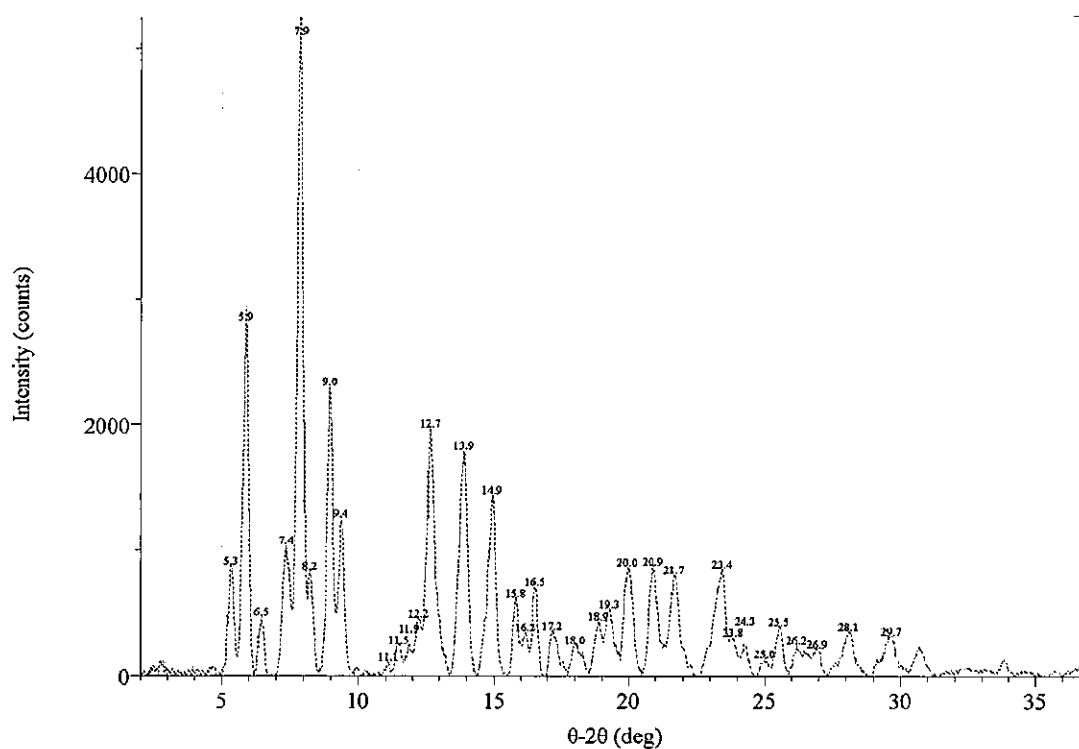
**Background subtracted XRPD pattern of Rifaximin, Form Iota.**

Figure 13



List of observed peaks for Rifaximin, Form Iota. Note that the peak labels in this image are meant as a visual aid.

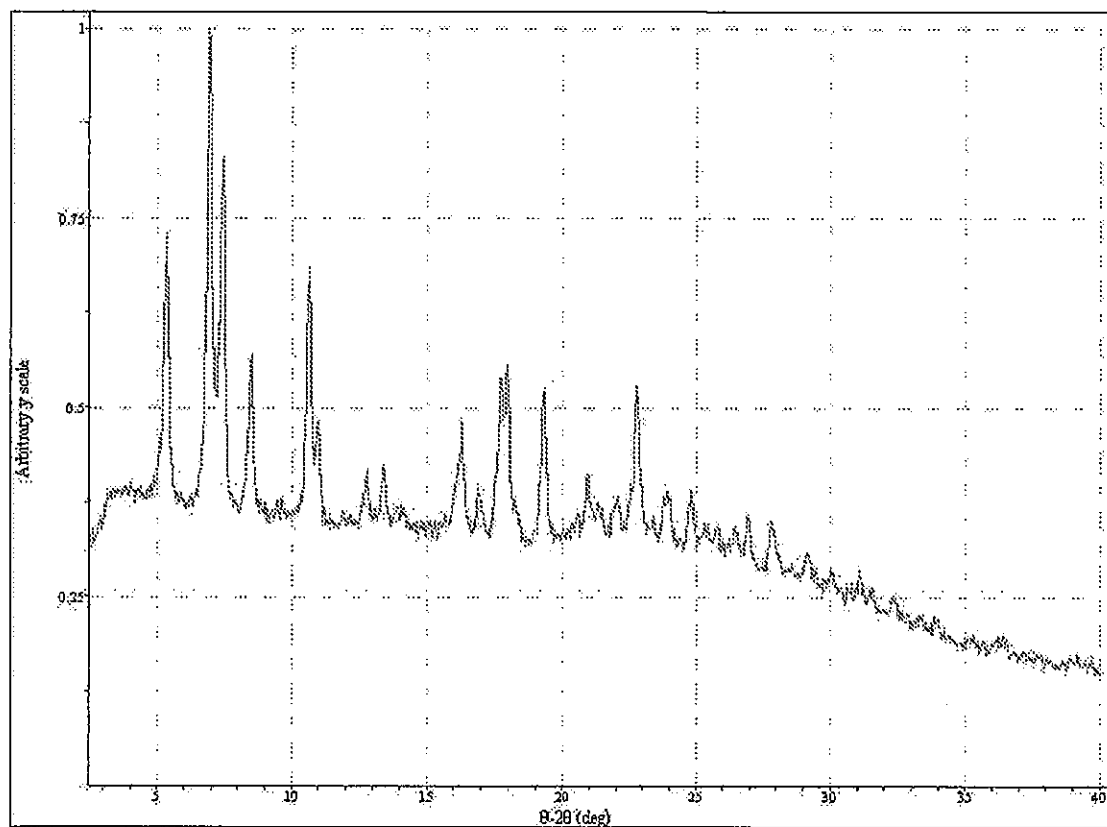
Figure 14**A. Observed peaks for Rifaximin, Form Iota**

2θ	d space (Å)	Intensity (%)
5.3 ± 0.1	16.550 ± 0.316	17
5.9 ± 0.1	15.031 ± 0.260	54
6.5 ± 0.1	13.683 ± 0.215	9
7.4 ± 0.1	12.011 ± 0.165	20
7.9 ± 0.1	11.220 ± 0.144	100
8.2 ± 0.1	10.757 ± 0.132	16
9.0 ± 0.1	9.870 ± 0.111	44
9.4 ± 0.1	9.449 ± 0.102	24
11.1 ± 0.1	7.957 ± 0.072	2
11.5 ± 0.1	7.695 ± 0.067	5
11.9 ± 0.1	7.450 ± 0.063	5
12.2 ± 0.1	7.231 ± 0.059	9
12.7 ± 0.1	6.992 ± 0.055	37
13.9 ± 0.1	6.371 ± 0.046	34
14.9 ± 0.1	5.930 ± 0.040	27
15.8 ± 0.1	5.602 ± 0.035	12
16.2 ± 0.1	5.478 ± 0.034	7
16.5 ± 0.1	5.360 ± 0.032	14
17.2 ± 0.1	5.162 ± 0.030	7
18.0 ± 0.1	4.928 ± 0.027	5
18.9 ± 0.1	4.700 ± 0.025	8
19.3 ± 0.1	4.604 ± 0.024	10
20.0 ± 0.1	4.448 ± 0.022	17
20.9 ± 0.1	4.250 ± 0.020	17
21.7 ± 0.1	4.099 ± 0.019	15
23.4 ± 0.1	3.795 ± 0.016	16
23.8 ± 0.1	3.733 ± 0.015	6
24.3 ± 0.1	3.663 ± 0.015	5
25.0 ± 0.1	3.559 ± 0.014	3
25.5 ± 0.1	3.488 ± 0.013	8
26.2 ± 0.1	3.401 ± 0.013	5
26.9 ± 0.1	3.310 ± 0.012	4
28.1 ± 0.1	3.176 ± 0.011	7
29.7 ± 0.1	3.010 ± 0.010	6

B. Prominent peaks for Rifaximin, Form Iota

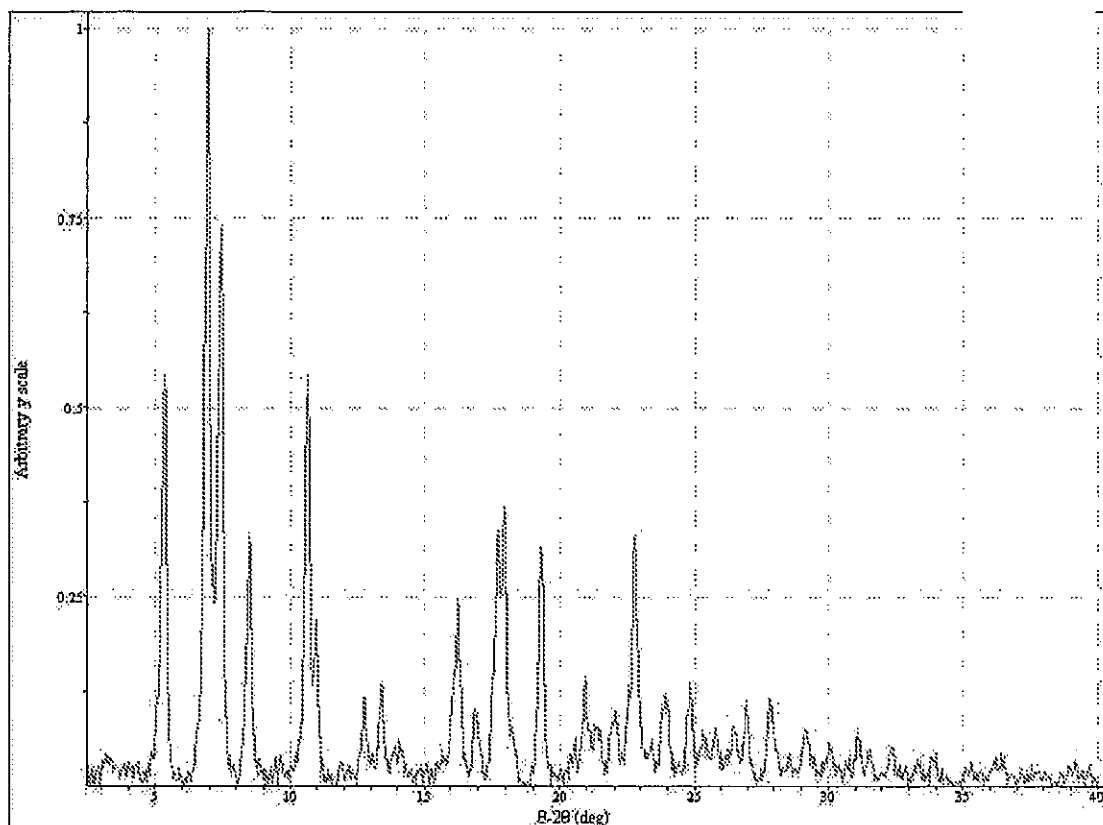
2θ	d space (Å)	Intensity (%)
5.9 ± 0.1	15.031 ± 0.260	54
7.9 ± 0.1	11.220 ± 0.144	100
9.0 ± 0.1	9.870 ± 0.111	44
12.7 ± 0.1	6.992 ± 0.055	37
13.9 ± 0.1	6.371 ± 0.046	34
14.9 ± 0.1	5.930 ± 0.040	27

Figure 15



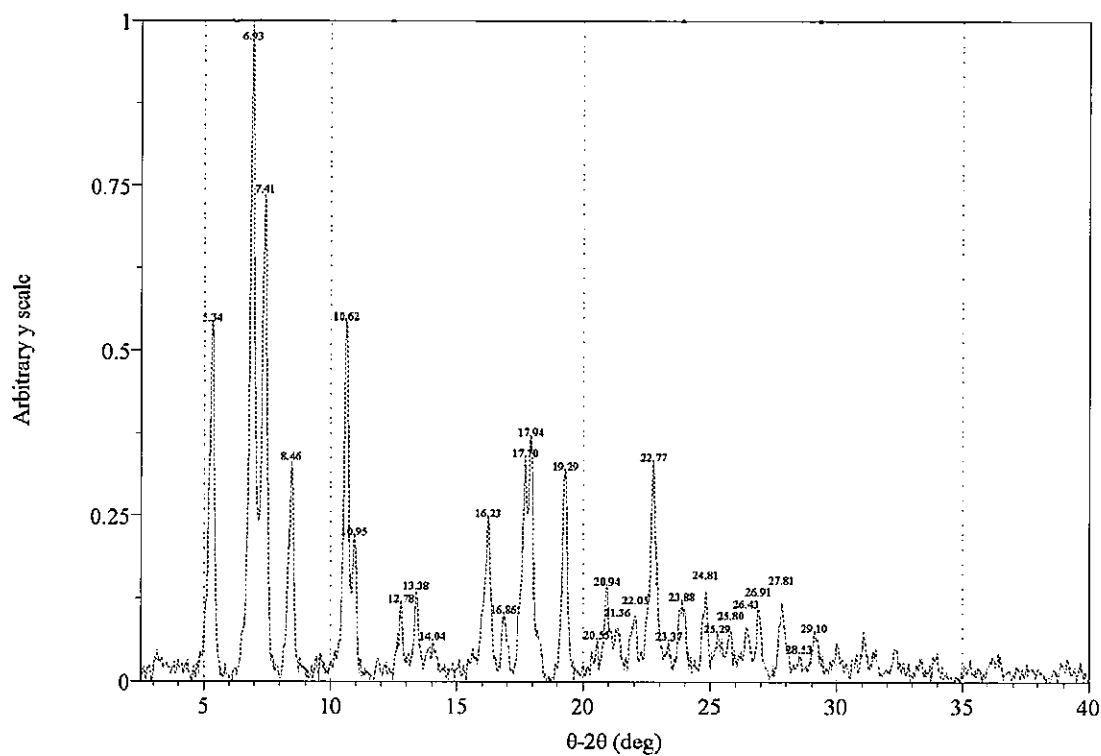
XRPD pattern of Rifaximin Mesylate Salt.

Figure 16



Background subtracted XRPD pattern of Rifaximin Mesylate Salt.

Figure 17



List of observed peaks for Rifaximin Mesylate Salt. Note that the peak labels in this image are meant as a visual aid.

Figure 18**A. Observed peaks for Rifaximin Mesylate Salt**

2θ	d space (Å)	Intensity (%)
5.34 ± 0.10	16.550 ± 0.316	54
6.93 ± 0.10	12.756 ± 0.187	100
7.41 ± 0.10	11.930 ± 0.163	74
8.46 ± 0.10	10.452 ± 0.125	33
10.62 ± 0.10	8.330 ± 0.079	55
10.95 ± 0.10	8.080 ± 0.074	22
12.78 ± 0.10	6.927 ± 0.054	12
13.38 ± 0.10	6.618 ± 0.050	14
14.04 ± 0.10	6.308 ± 0.045	6
16.23 ± 0.10	5.461 ± 0.034	25
16.86 ± 0.10	5.259 ± 0.031	10
17.70 ± 0.10	5.011 ± 0.028	34
17.94 ± 0.10	4.945 ± 0.027	37
19.29 ± 0.10	4.601 ± 0.024	32
20.55 ± 0.10	4.322 ± 0.021	6
20.94 ± 0.10	4.242 ± 0.020	15
21.36 ± 0.10	4.160 ± 0.019	8
22.05 ± 0.10	4.031 ± 0.018	10
22.77 ± 0.10	3.905 ± 0.017	33
23.37 ± 0.10	3.807 ± 0.016	6
23.88 ± 0.10	3.726 ± 0.015	12
24.81 ± 0.10	3.589 ± 0.014	14
25.29 ± 0.10	3.522 ± 0.014	7
25.80 ± 0.10	3.453 ± 0.013	8
26.43 ± 0.10	3.372 ± 0.013	8
26.91 ± 0.10	3.313 ± 0.012	11
27.81 ± 0.10	3.208 ± 0.011	12
28.53 ± 0.10	3.129 ± 0.011	4
29.10 ± 0.10	3.069 ± 0.010	7

B. Prominent peaks for Rifaximin Mesylate Salt

2θ	d space (Å)	Intensity (%)
5.34 ± 0.10	16.550 ± 0.316	54
6.93 ± 0.10	12.756 ± 0.187	100
7.41 ± 0.10	11.930 ± 0.163	74
8.46 ± 0.10	10.452 ± 0.125	33
10.62 ± 0.10	8.330 ± 0.079	55
10.95 ± 0.10	8.080 ± 0.074	22
16.23 ± 0.10	5.461 ± 0.034	25
17.70 ± 0.10	5.011 ± 0.028	34
17.94 ± 0.10	4.945 ± 0.027	37
19.29 ± 0.10	4.601 ± 0.024	32
22.77 ± 0.10	3.905 ± 0.017	33

Figure 19

XRPD overlay of rifaximin amorphous attempts (top to bottom):

Lyophilization (p-dioxane:water)

Crash precipitation (ethyl acetate with hexanes)

Fast evaporation (acetone)

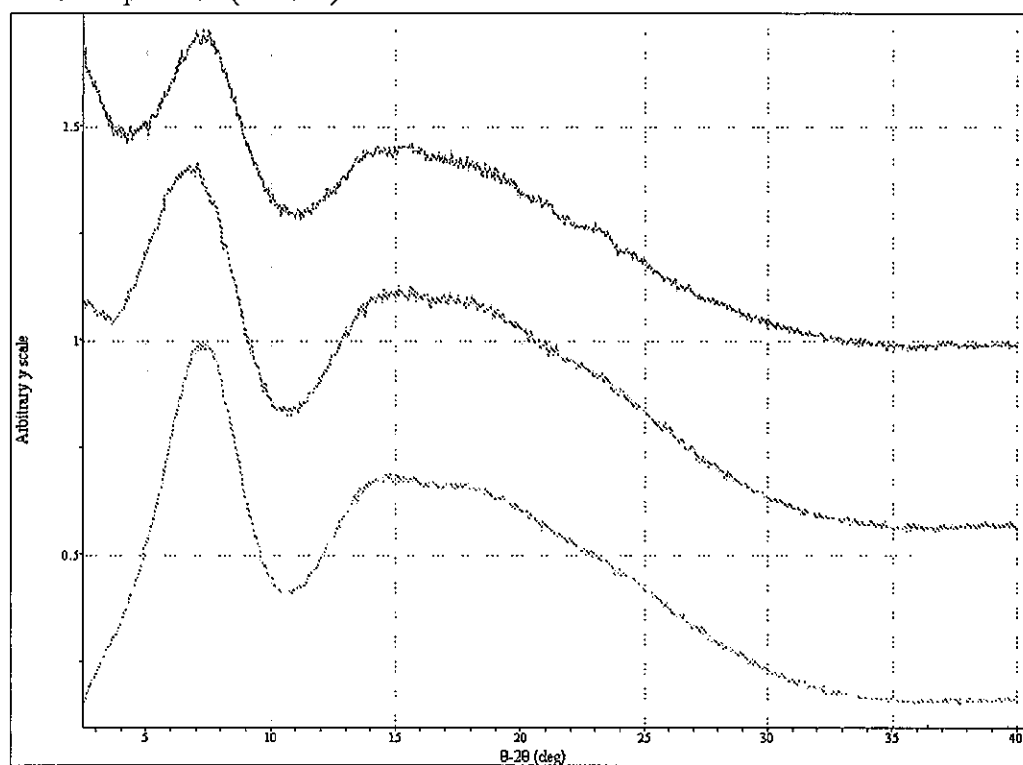


Figure 20

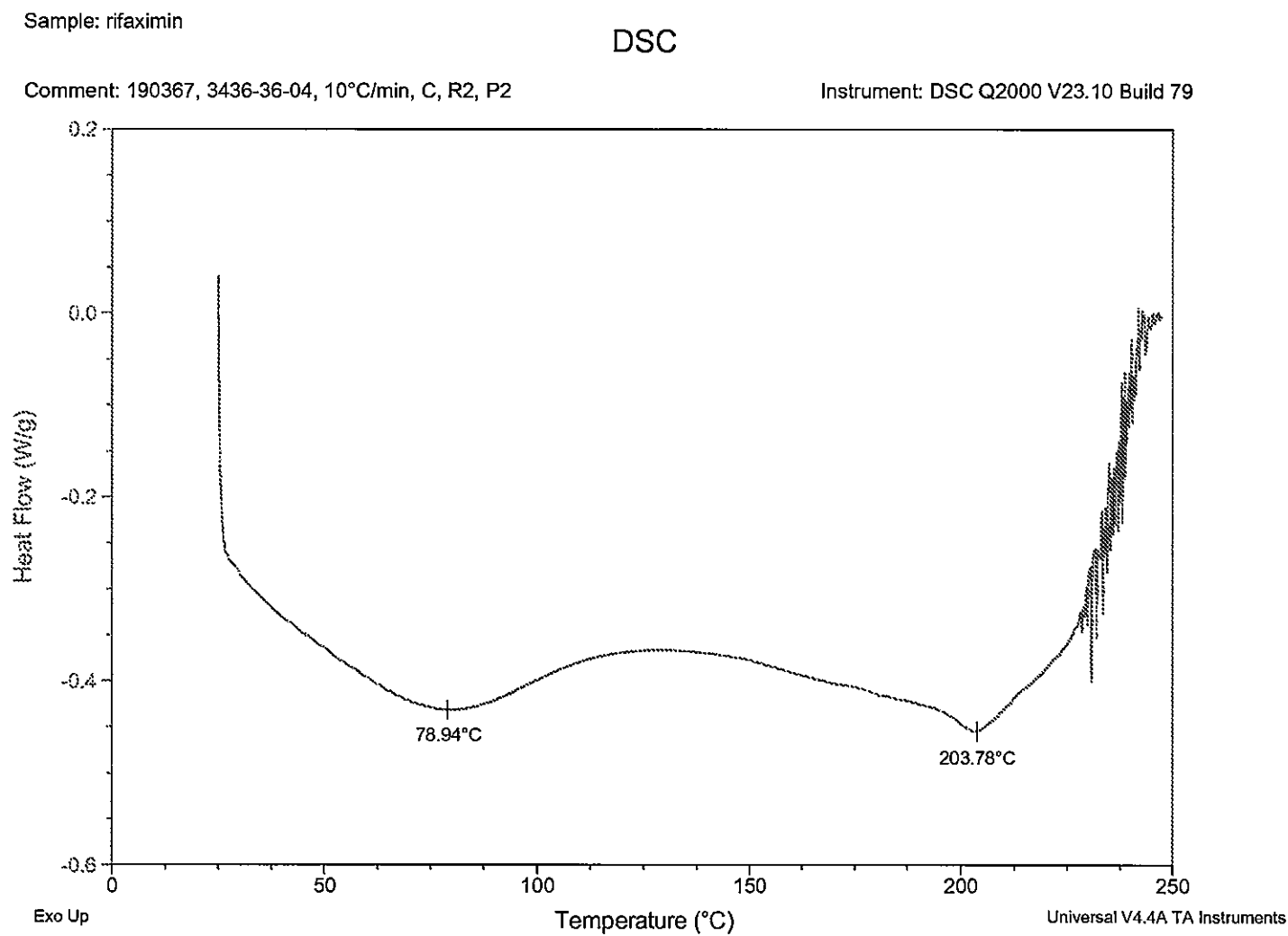
DSC of Rifaximin, amorphous (crash precipitation from ethyl acetate with heptane)

Figure 21
Cycling DSC of Rifaximin, amorphous (crash precipitation from ethyl acetate with heptane)

Sample: rifaximin

DSC

Comment: 190367, 3436-36-04, 20°C/min, C, R1, P2

Instrument: DSC Q2000 V23.10 Build 79

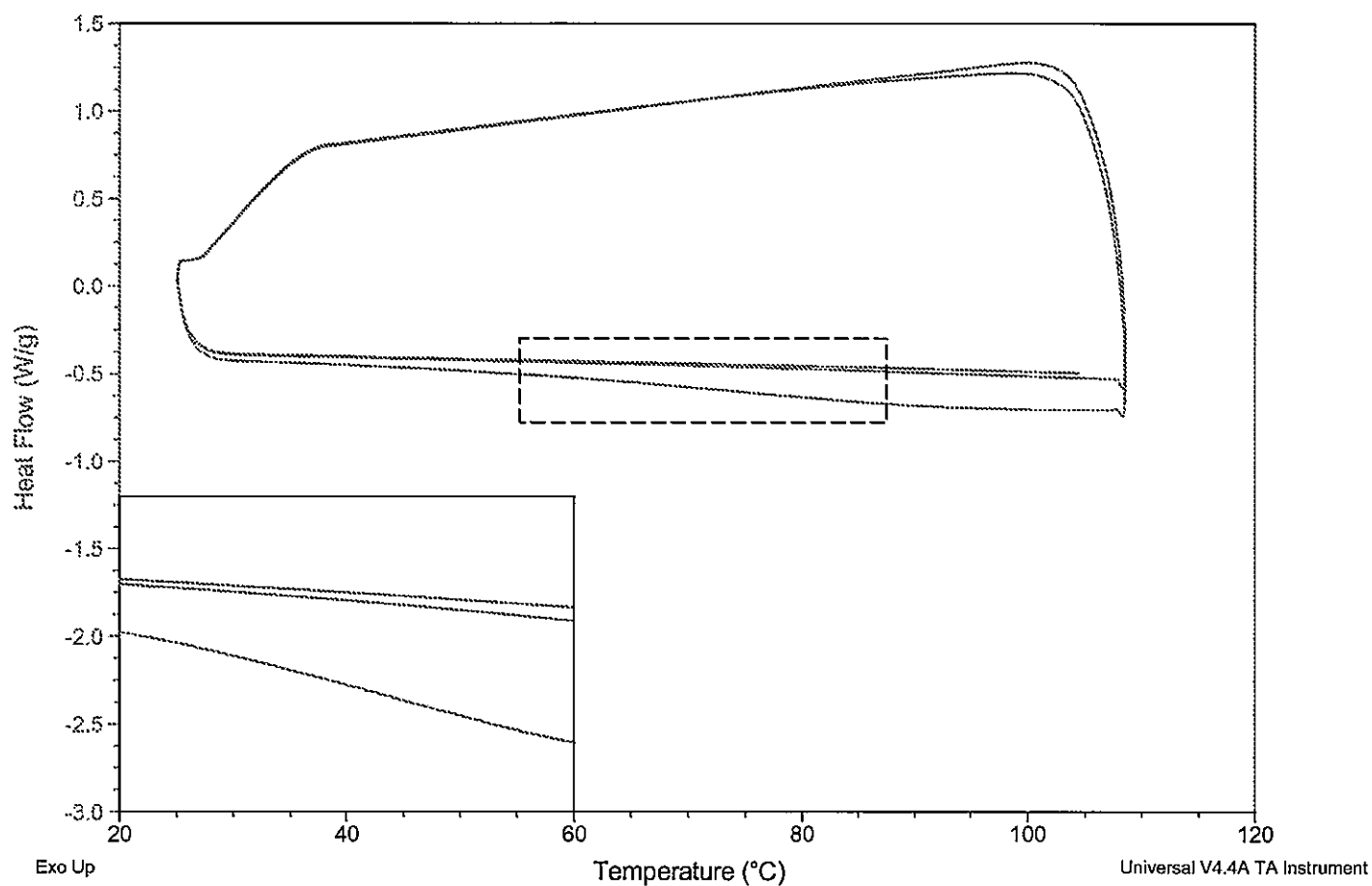


Figure 22

TG of Rifaximin, amorphous (crash precipitation from ethyl acetate with heptane)

Sample: rifaximin

TGA

Comment: 190367, 3436-36-04, 10°C/min

Run Date: 15-Jan-2009 14:26

Instrument: TGA Q5000 V3.3 Build 250

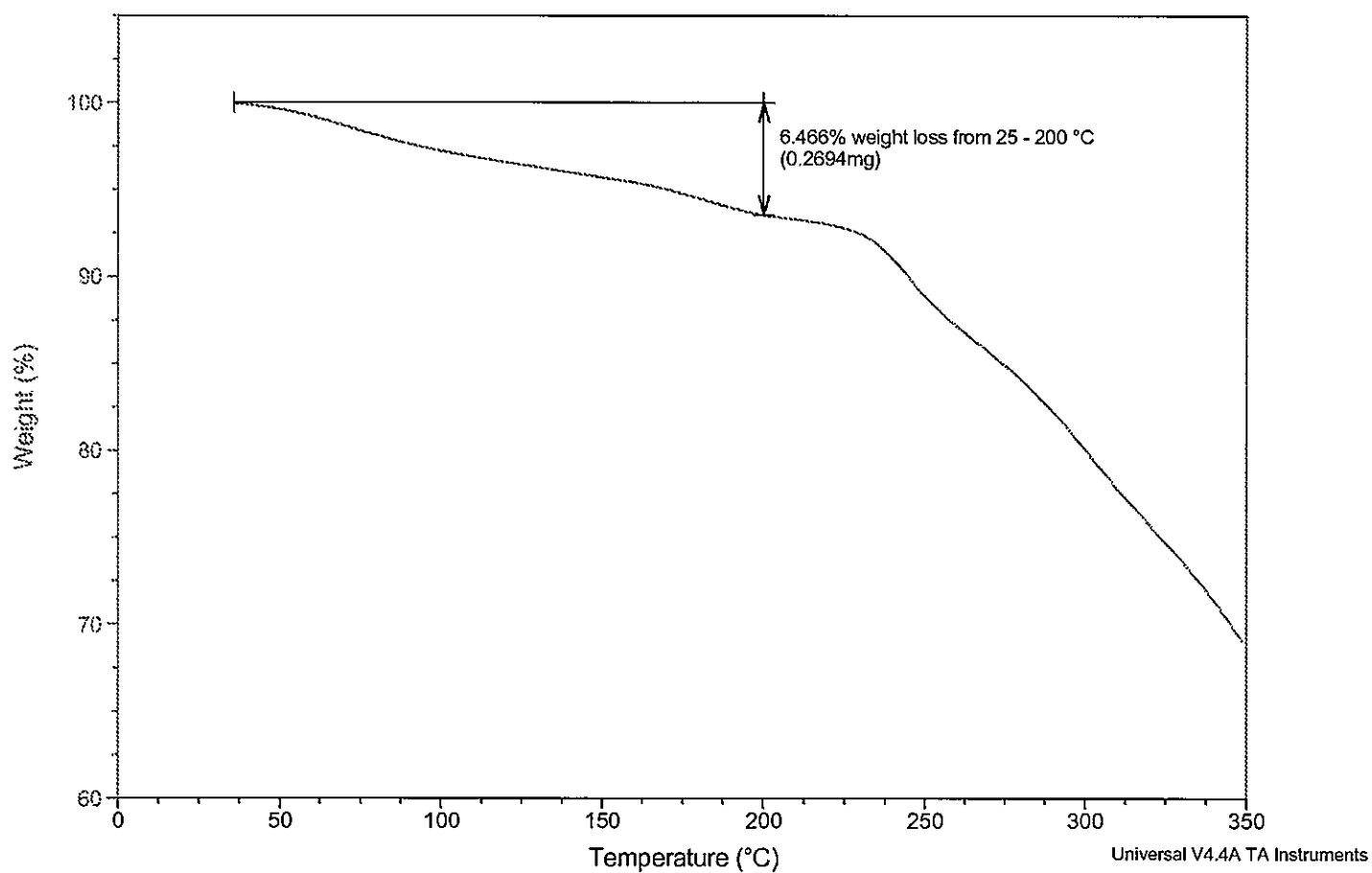


Figure 23

XRPD overlay of Rifaximin, amorphous (top to bottom):
Amorphous (crash precipitation from ethyl acetate with heptane)
Likely amorphous

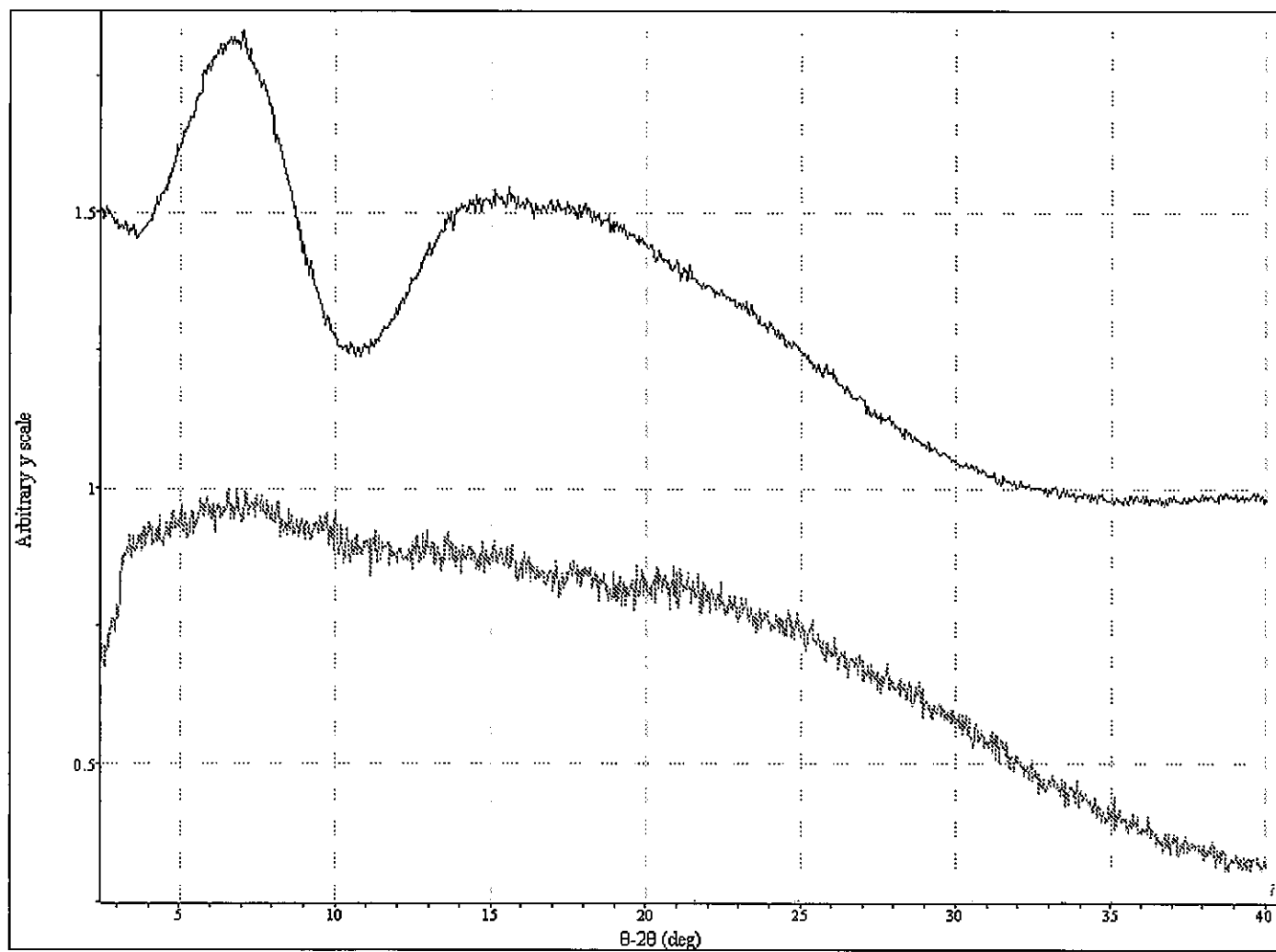


Figure 24

Cycling DSC of Rifaximin, amorphous (lyophilization in p-dioxane: water 1:1)

Sample: rifaximin

DSC

Comment: 190256, 3262-78-01, 20°C/min, C, R1, P1

Instrument: DSC Q2000 V23.10 Build 79

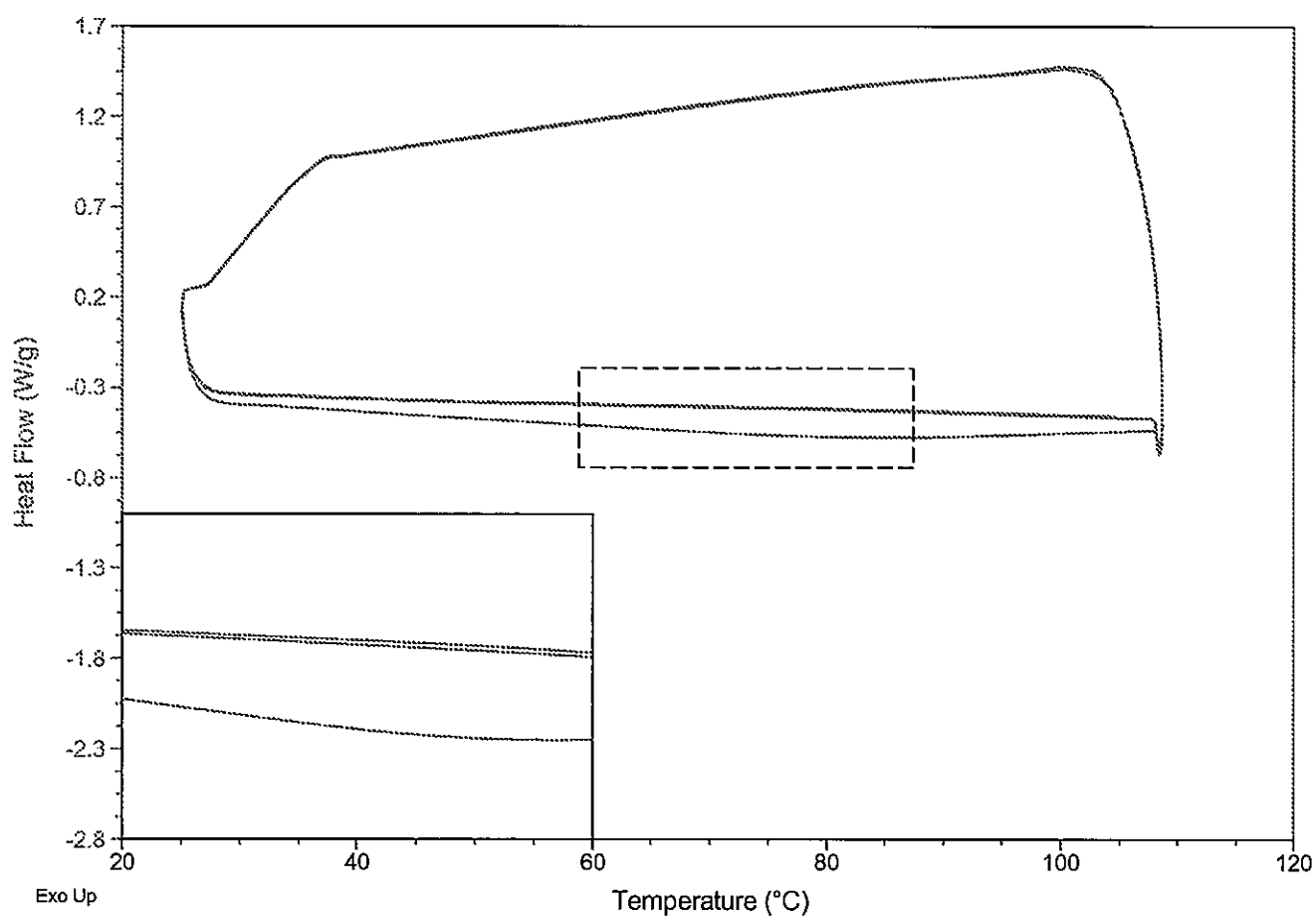


Figure 25

TG of Rifaximin, amorphous (lyophilization in p-dioxane: water 1:1)

Sample: rifaximin

TGA

Comment: 190256, 3262-78-01, 10°C/min

Instrument: TGA Q5000 V3.3 Build 250

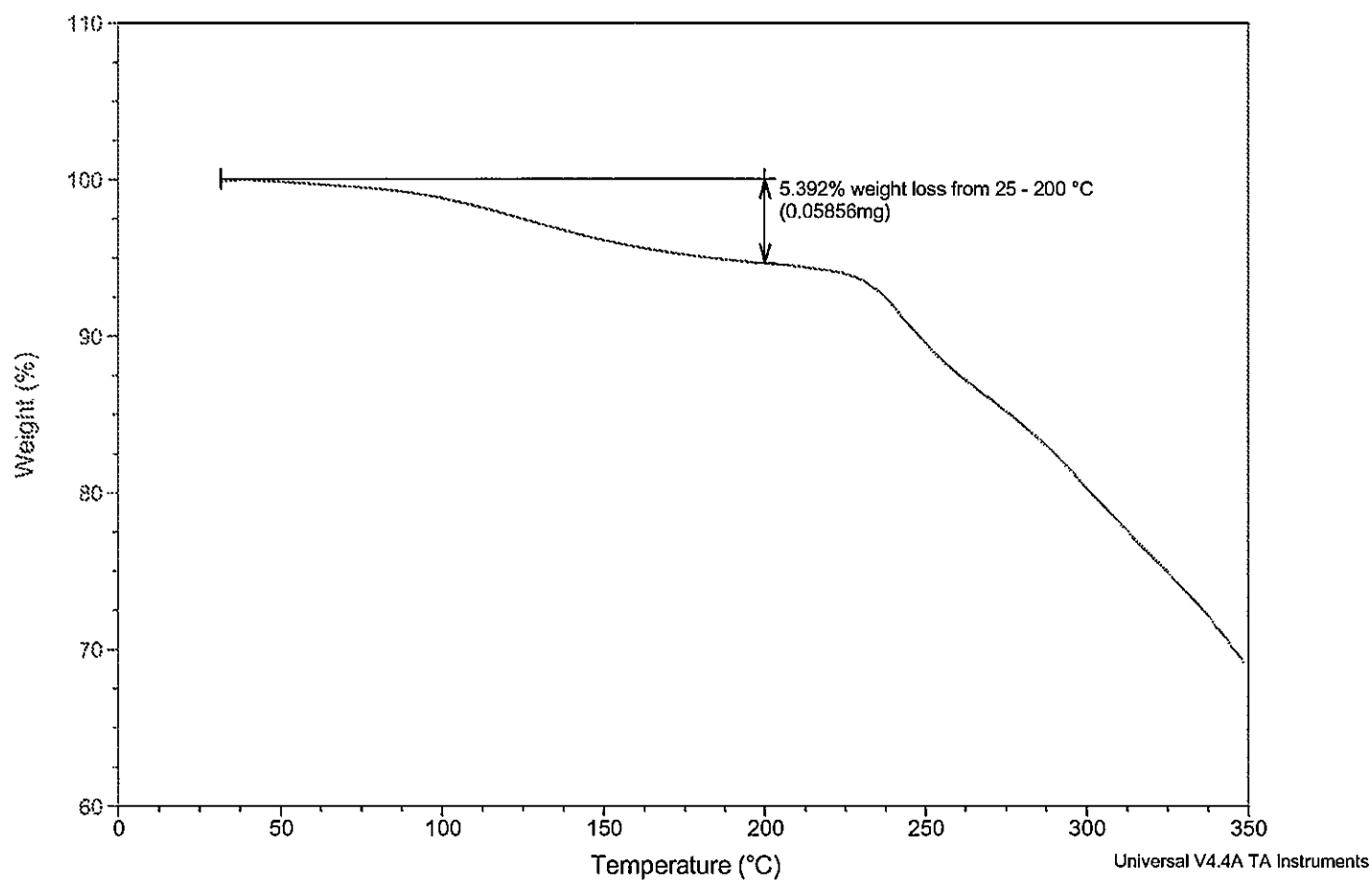


Figure 26

XRPD of Rifaximin, amorphous (top to bottom):

Amorphous (lyophilization in p-dioxane: water 1:1)

Likely amorphous,

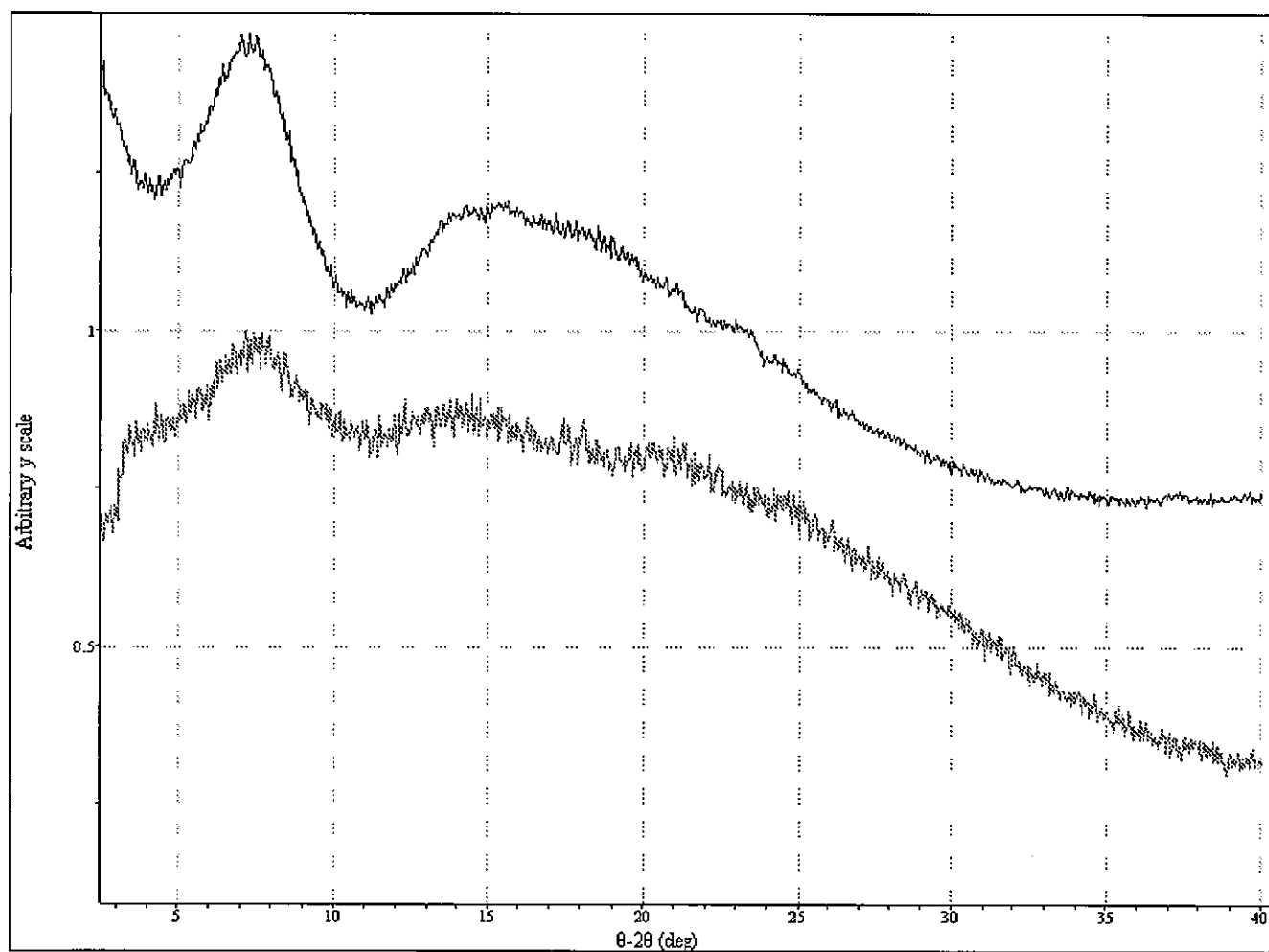


Figure 27

Cycling DSC of Rifaximin, amorphous (fast evaporation from acetone)

Sample: rifaximin

DSC

Comment: 190415, 3436-36-03, 20°C/min, C, R1, P3

Instrument: DSC Q2000 V23.10 Build 79

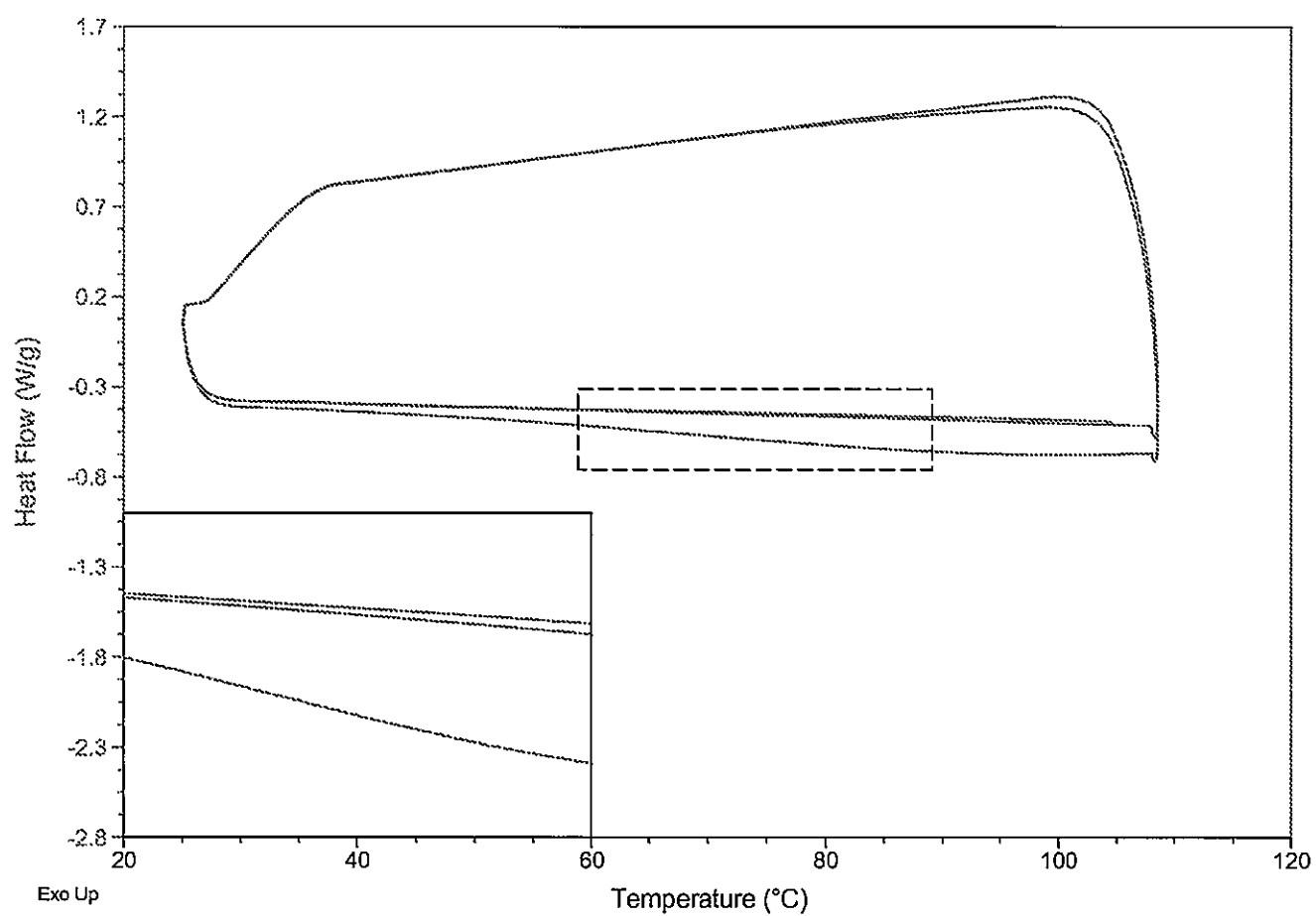


Figure 28

TG of Rifaximin, amorphous (fast evaporation from acetone)

Sample: rifaximin

TGA

Comment: 190415, 3436-36-03, 10°C/min

Instrument: TGA Q5000 V3.3 Build 250

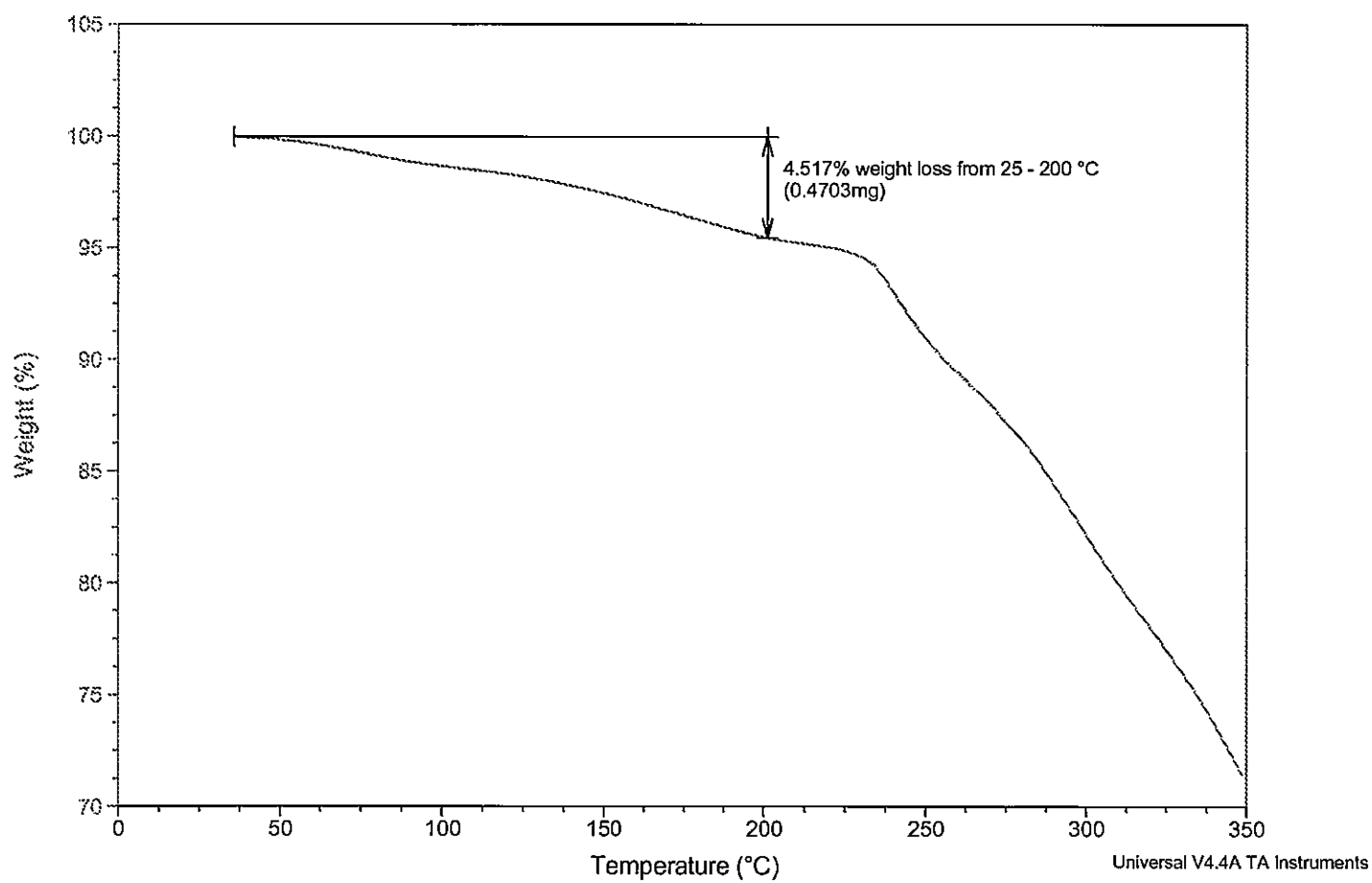


Figure 29
Modulated DSC of Rifaximin, amorphous (crash precipitation from ethyl acetate with heptane)

Sample: rifaximin

DSC

Comment: 190367, 3436-36-04, 2°C/min, HS, R1, P1

Instrument: DSC Q2000 V23.10 Build 79

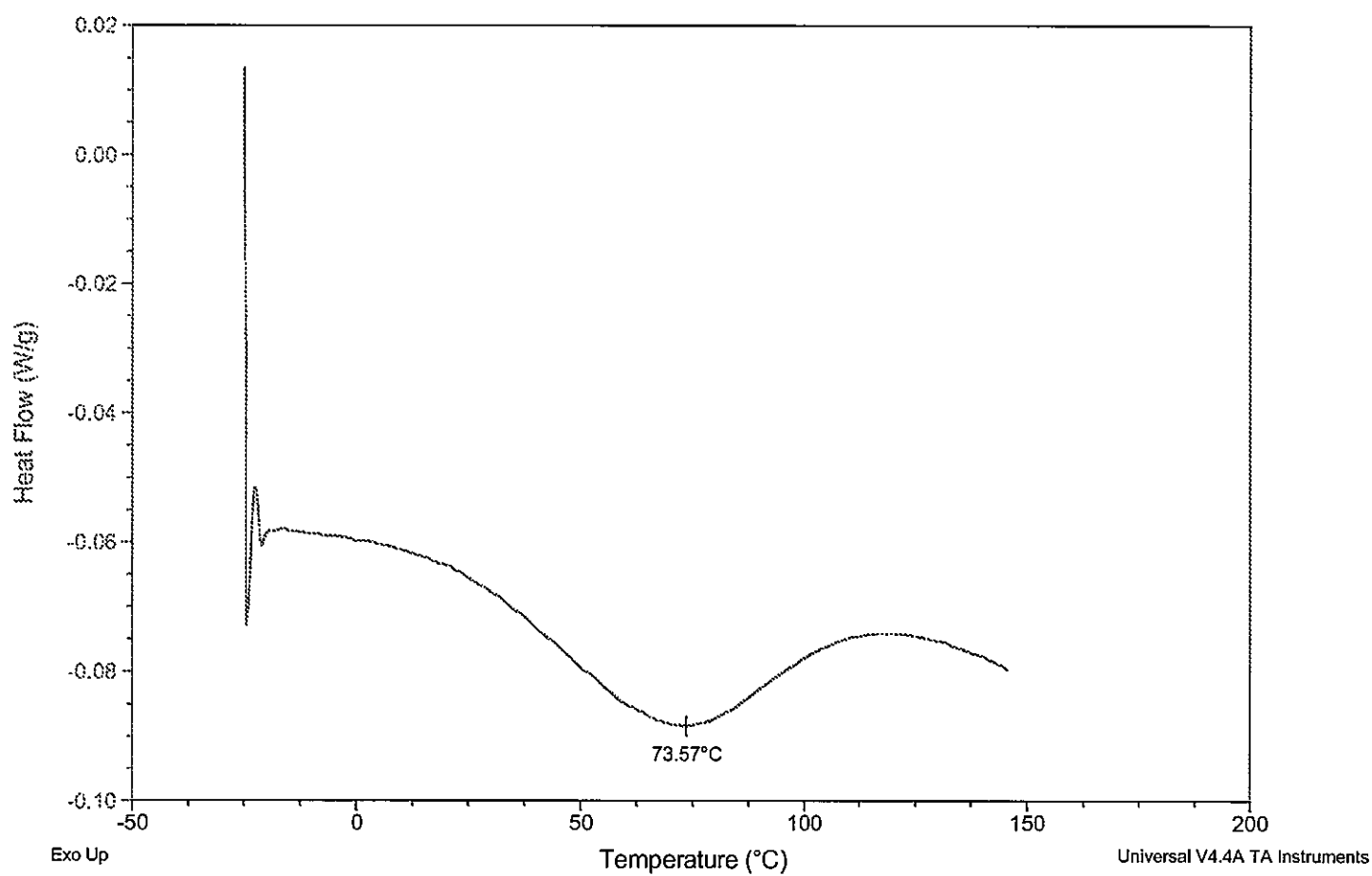


Figure 30

Modulated DSC of Rifaximin, amorphous (crash precipitation from ethyl acetate with heptane)

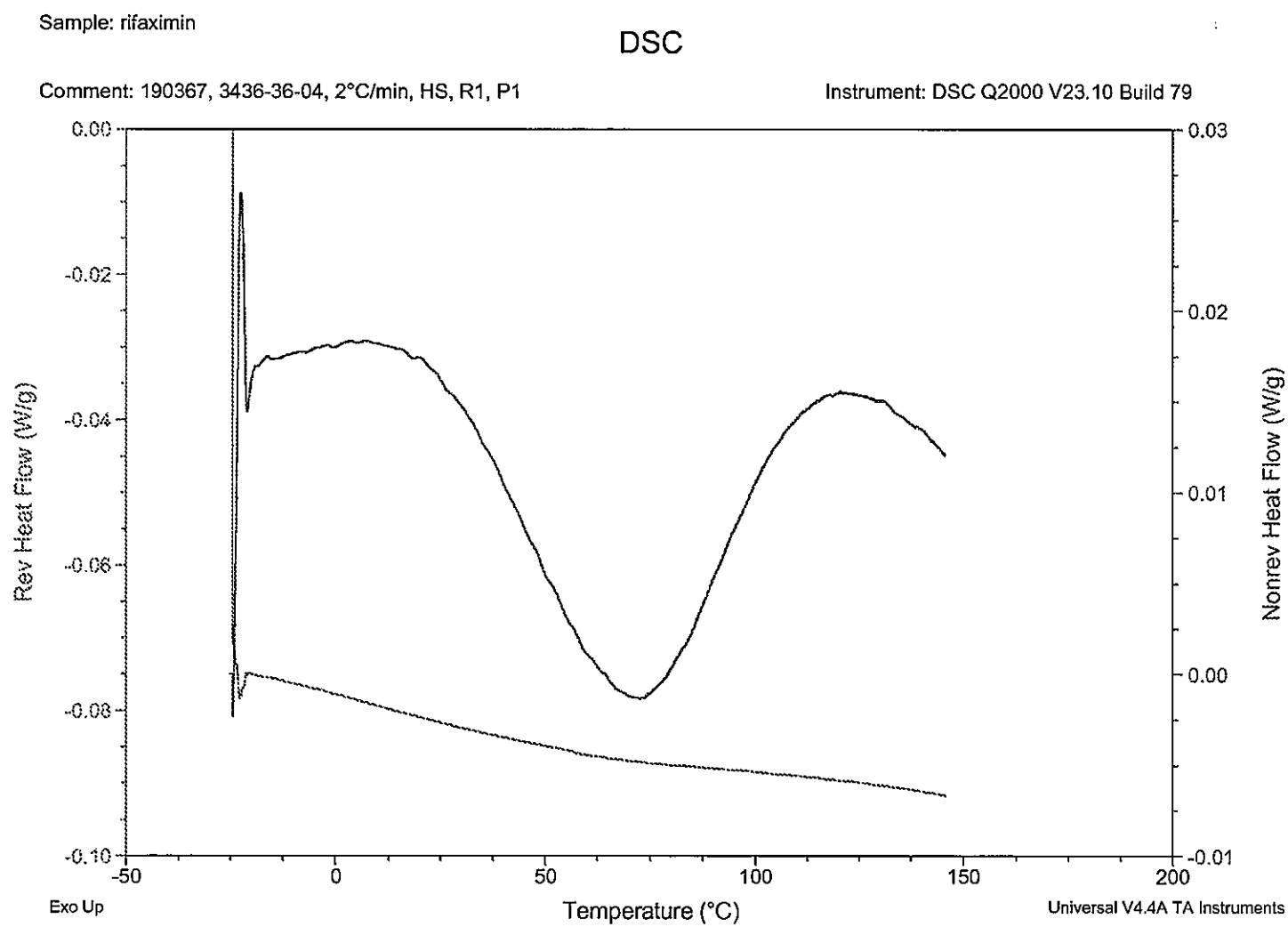


Figure 31

Thermal data for Rifaximin, Form 1

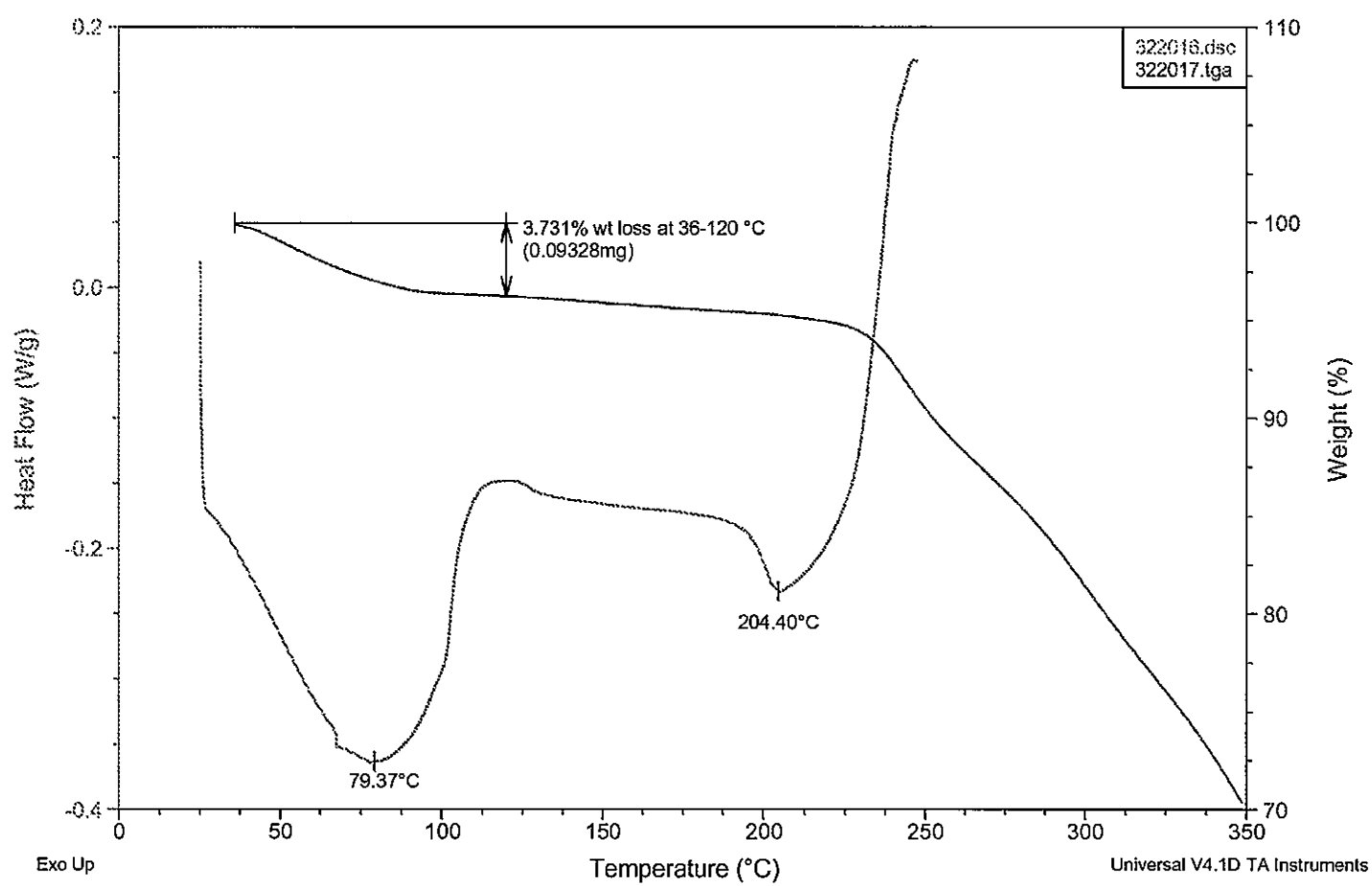
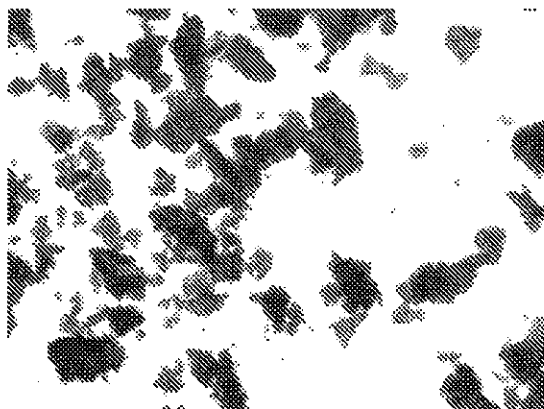
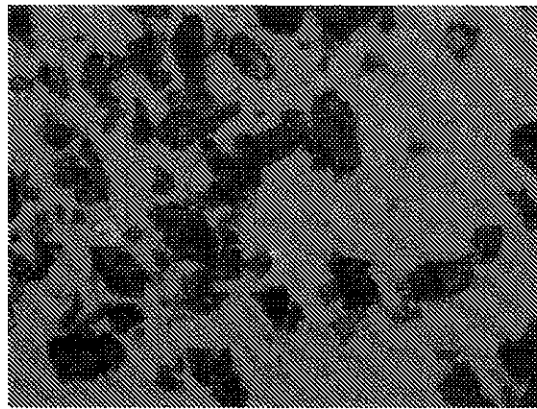


Figure 32

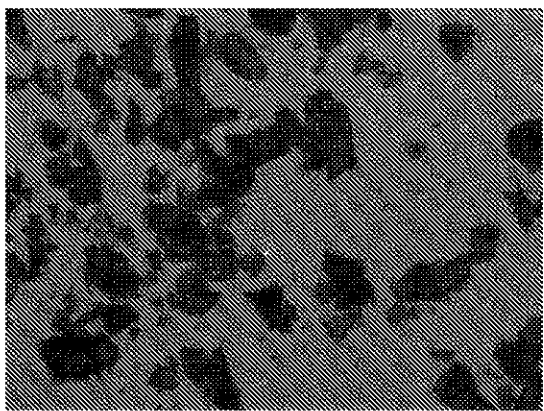
Hot stage microscopy of Rifaximin, Form 1.



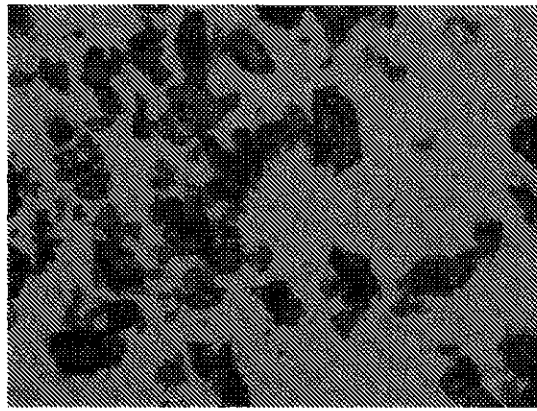
T = 30 °C



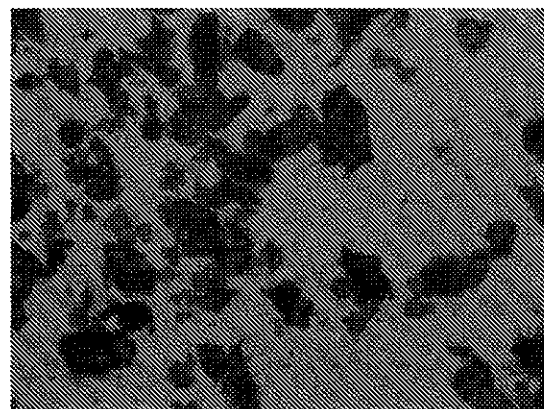
T = 30 °C



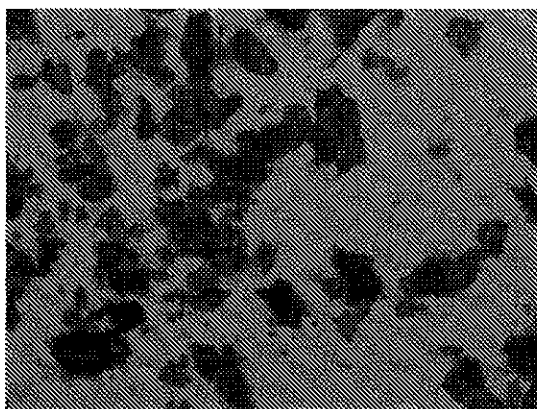
T = 80 °C



T = 120 °C



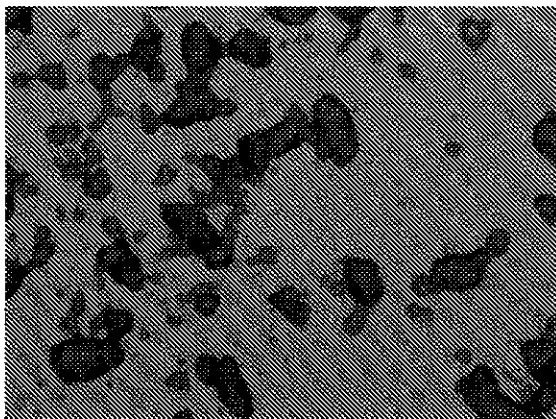
T = 190 °C



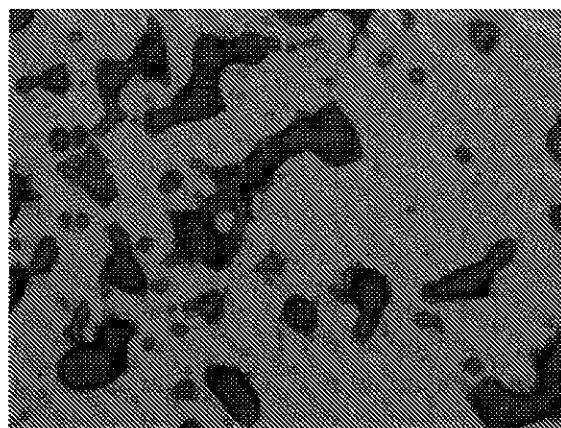
T = 204 °C

Figure 32 (Cont.)

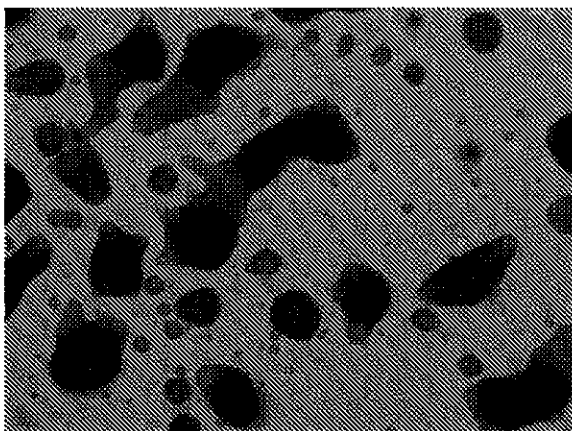
Hot stage microscopy of Rifaximin, Form 1



T = 218 °C



T = 222 °C



T = 250 °C

Figure 33

FT-IR spectrum of Rifaximin, Form 1

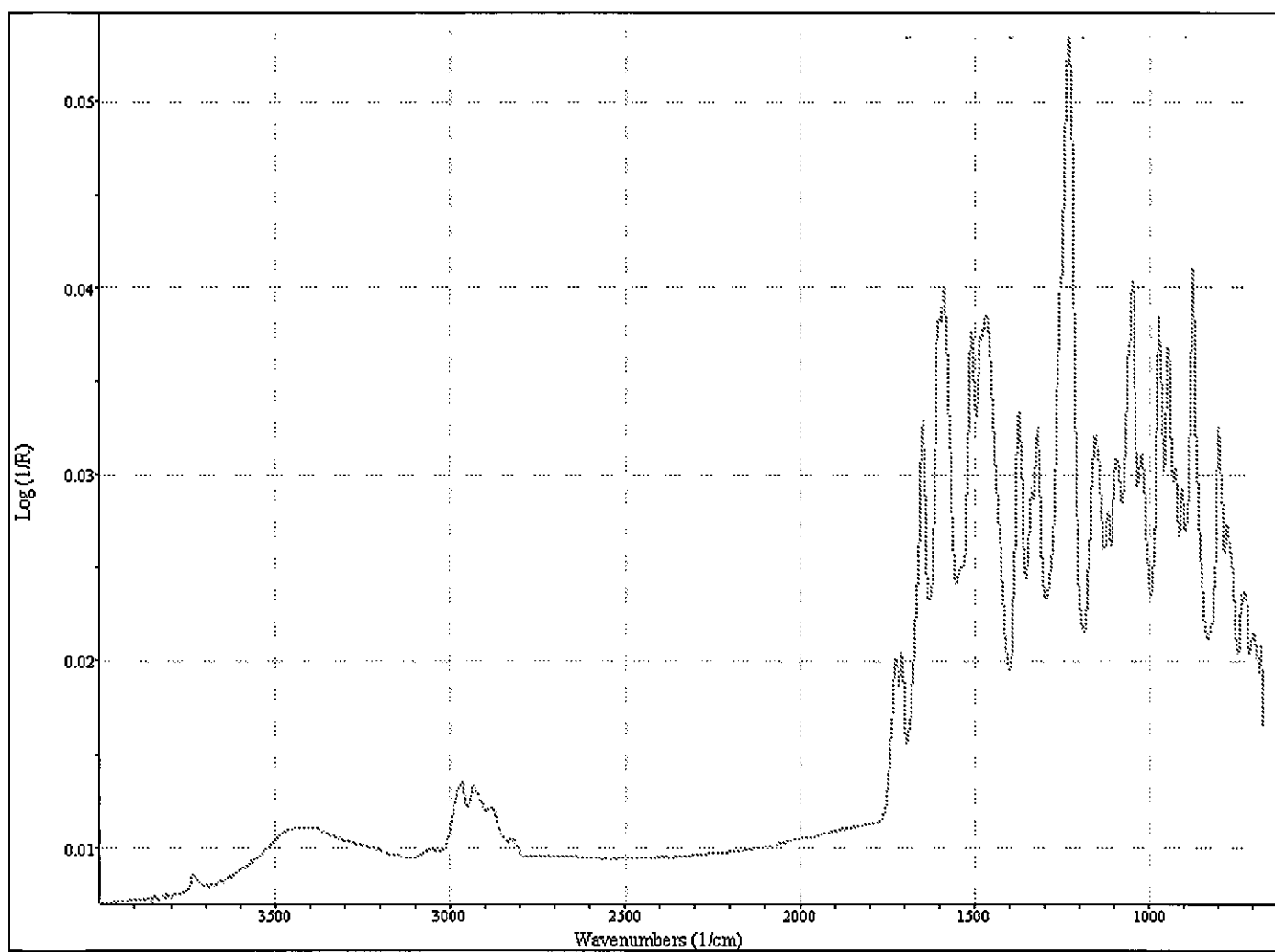


Figure 34

Proton NMR spectrum of Rifaximin, Form I

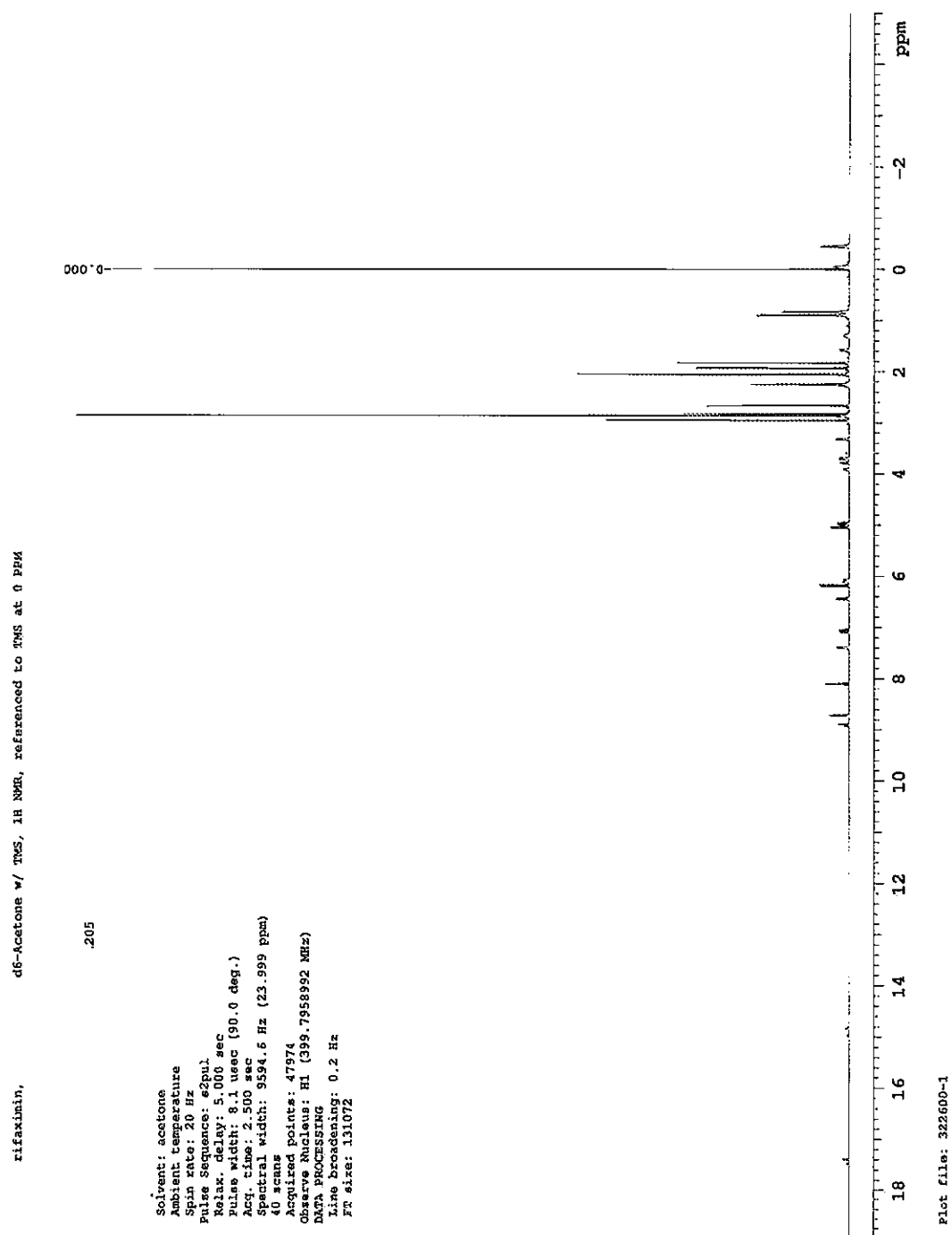
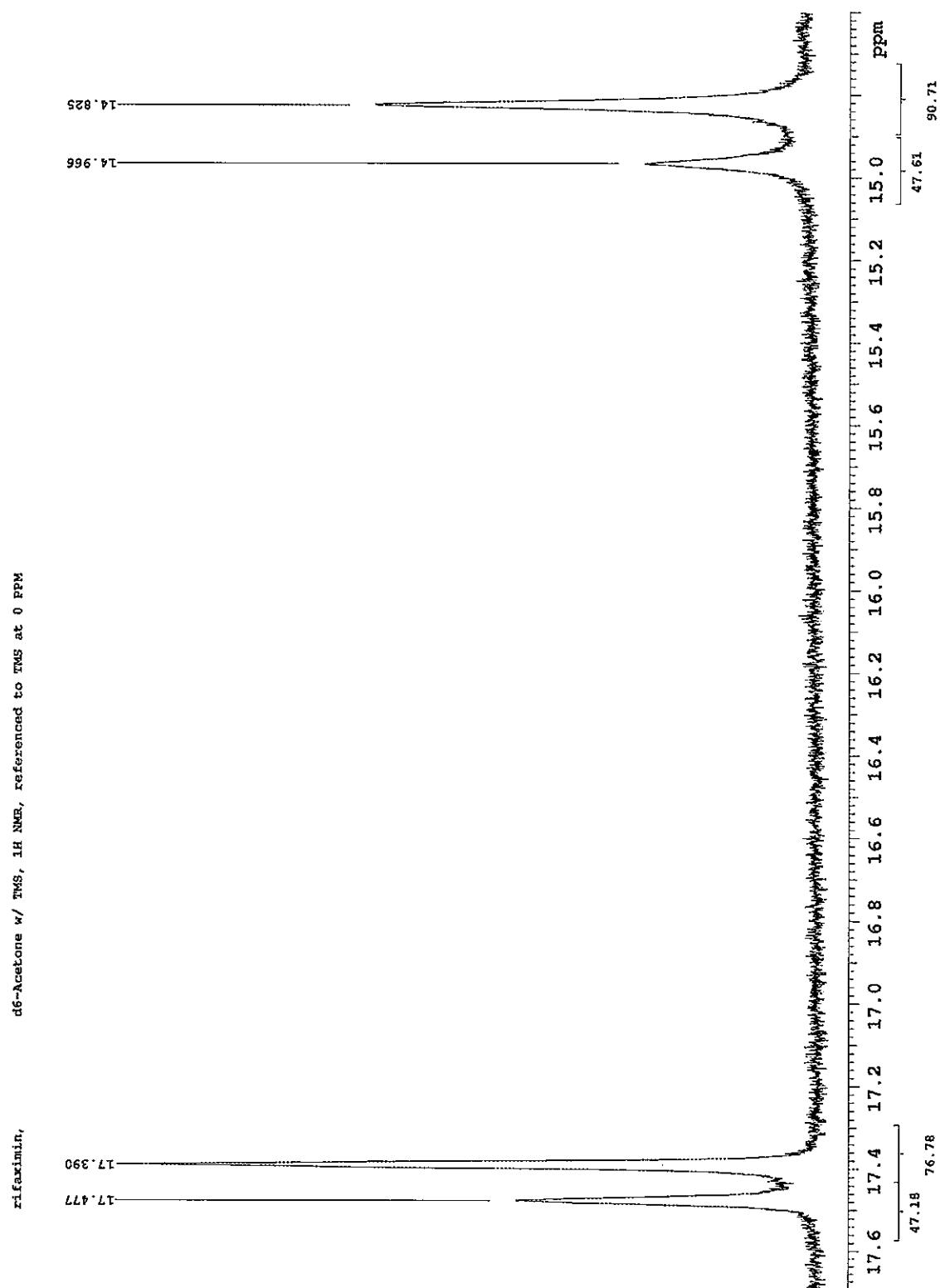


Figure 34 (cont.)

Proton NMR spectrum of Rifaximin, Form I



Plot file: 322600-2

Figure 34 (cont.)
Proton NMR spectrum of Rifaximin, Form I

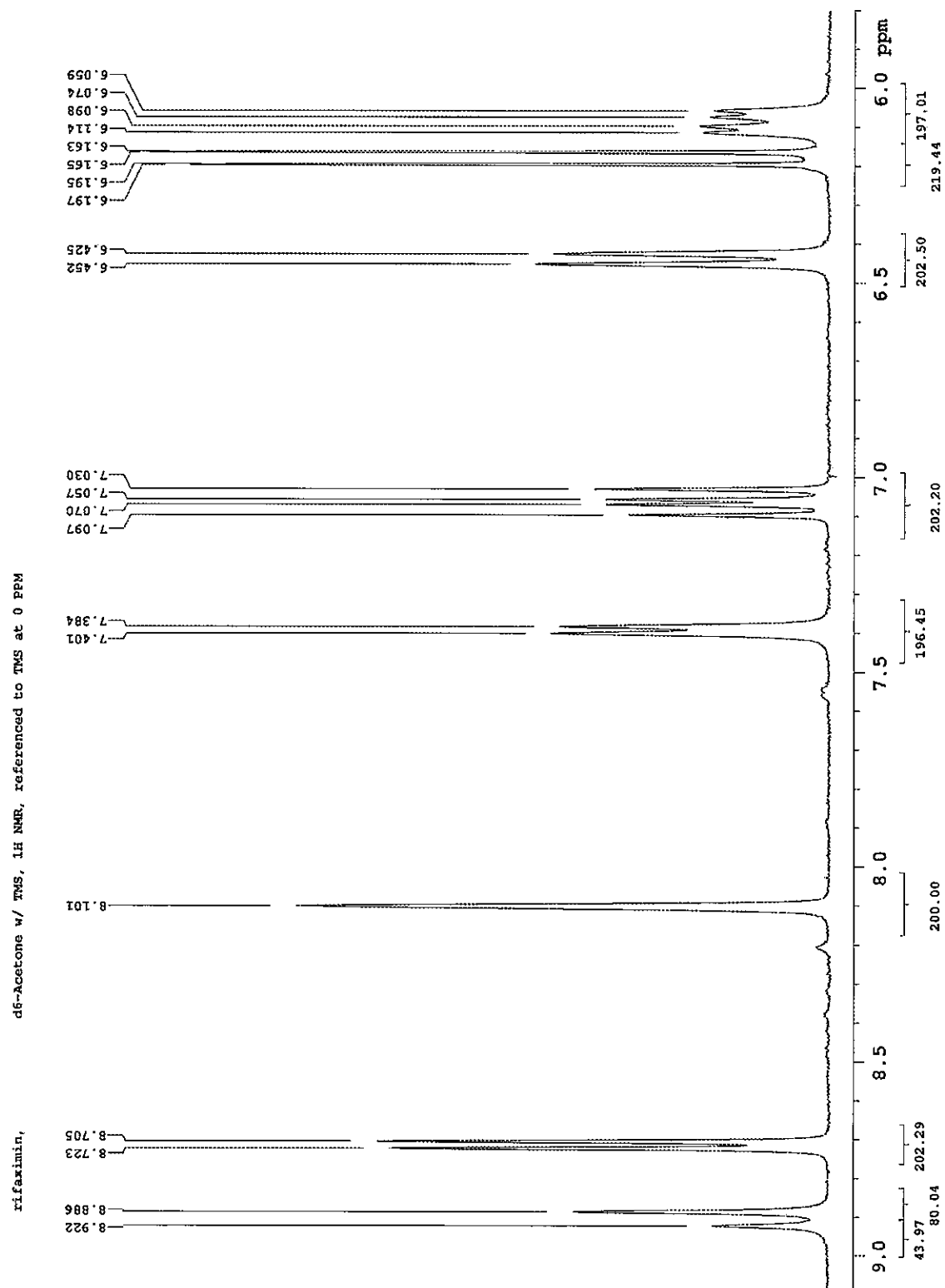


Figure 34 (cont.)

Proton NMR spectrum of Rifaximin, Form

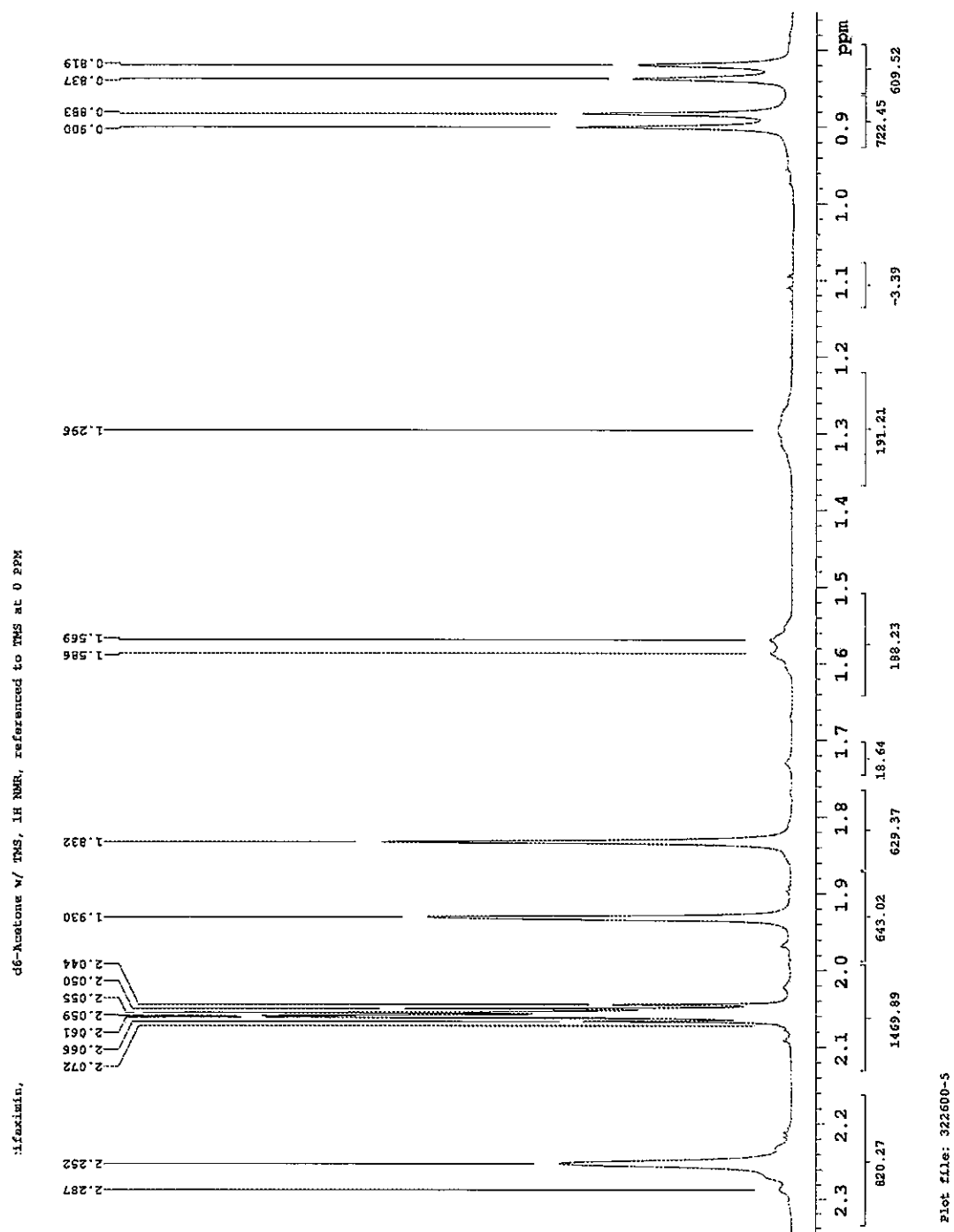


Figure 34 (cont.)

Proton NMR spectrum of Rifaximin, Form 1

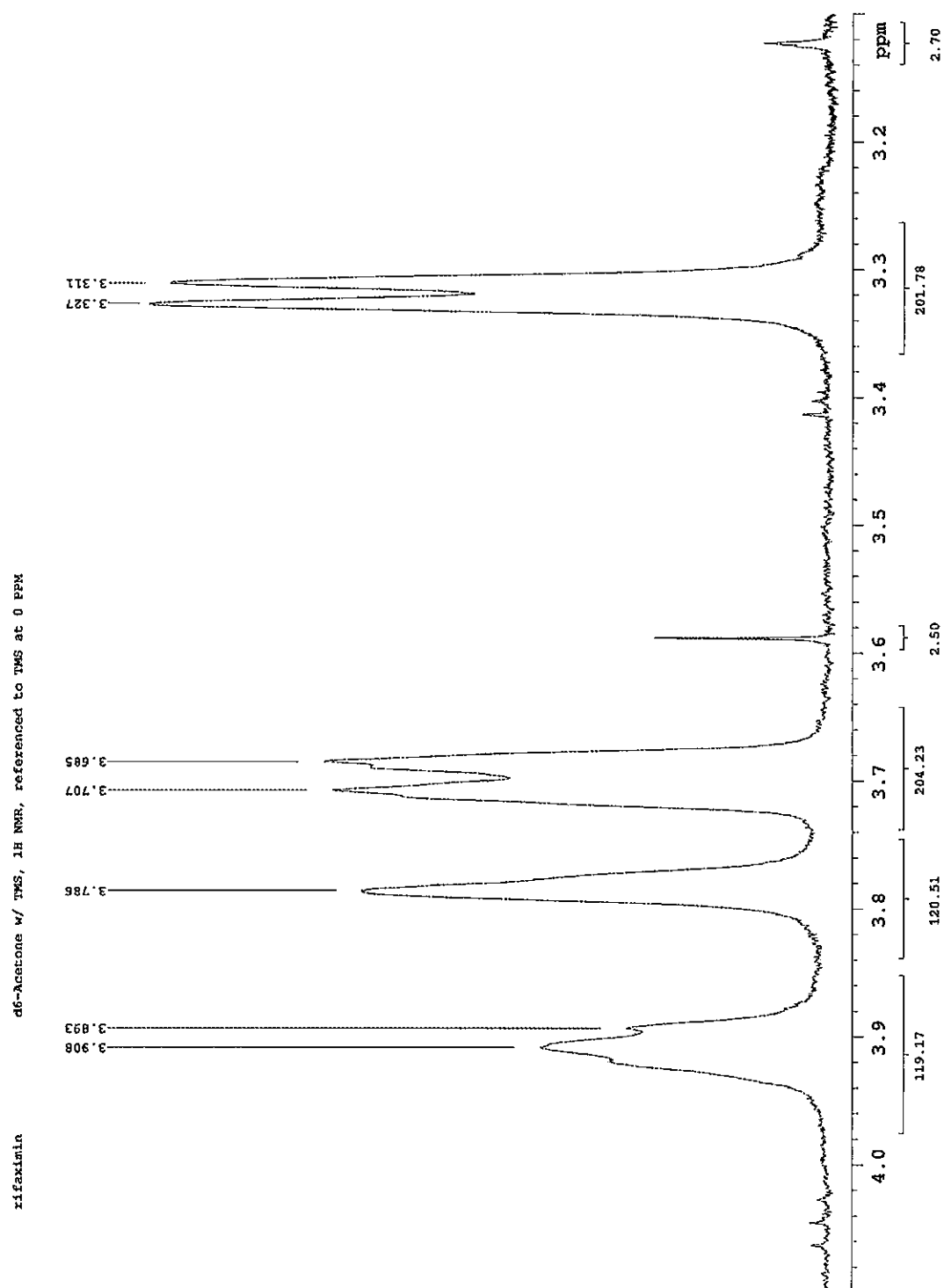


Figure 35

Rifaximin – Overlay of FT-IR Spectra – expanded from 3730 to 2663 cm^{-1}

Top to bottom:

First Form α
Second Form α dry
Third Form β
Fourth Form γ
Fifth Form δ
Sixth Form ϵ
Seventh Form amorphous

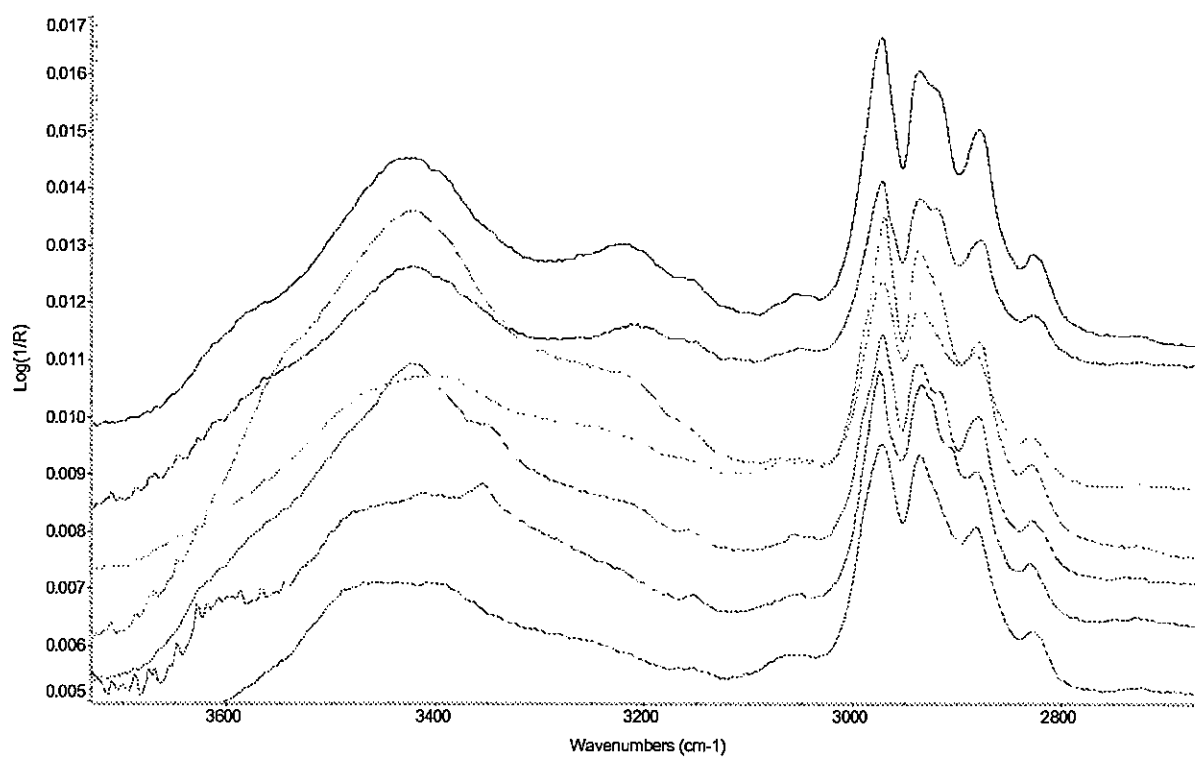


Figure 36

XRPD pattern comparison of Rifaximin form α dry (top), form α (middle), and form α reference (bottom)

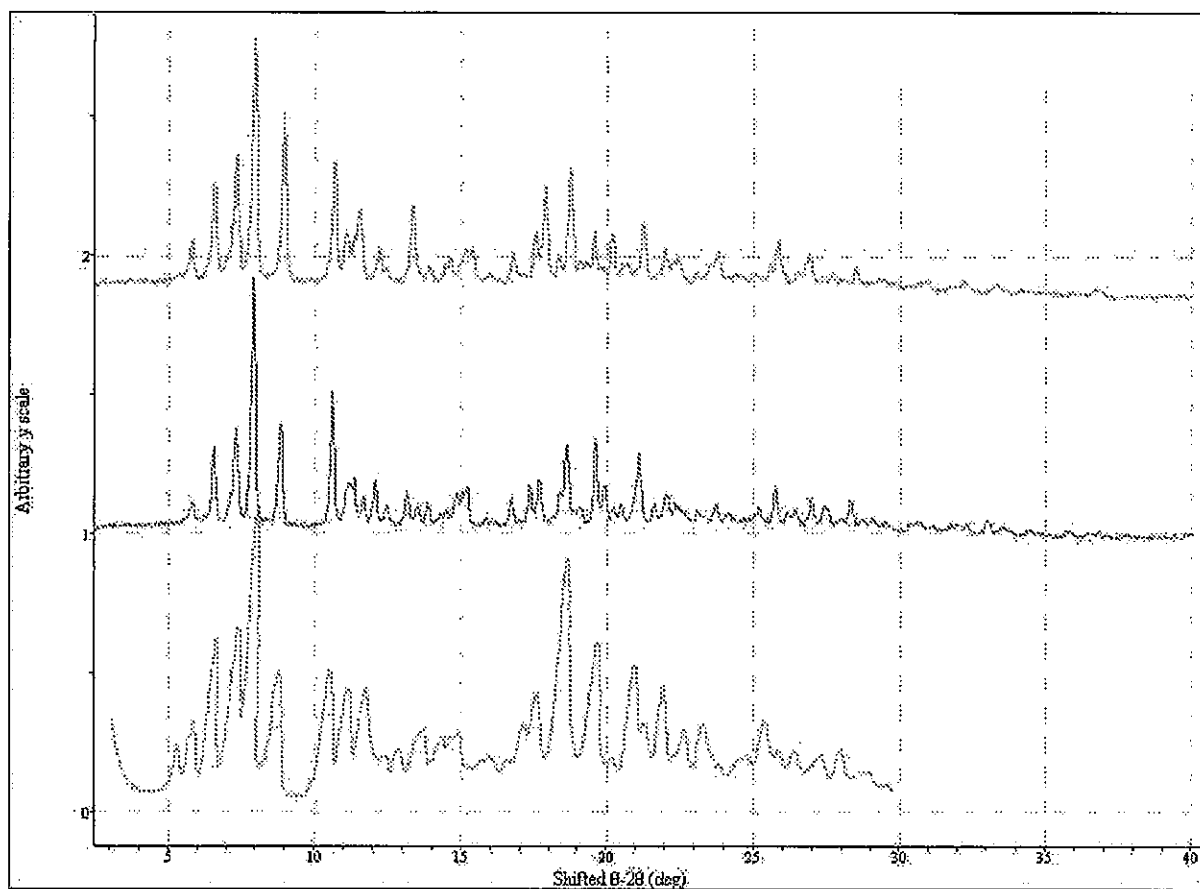


Figure 37

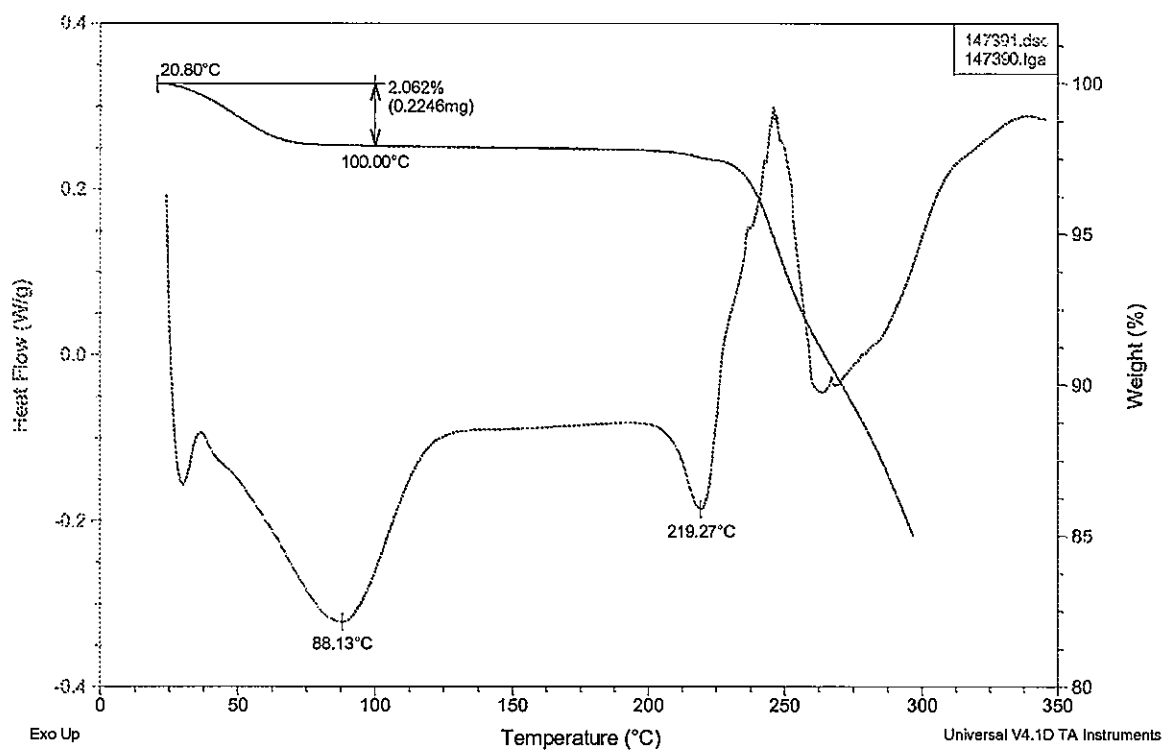
TGA and DSC of Rifaximin form α dry

Figure 38

XRPD Comparison of Rifaximin Form β -1, β -2, β and Reference Form β

Top to Bottom:

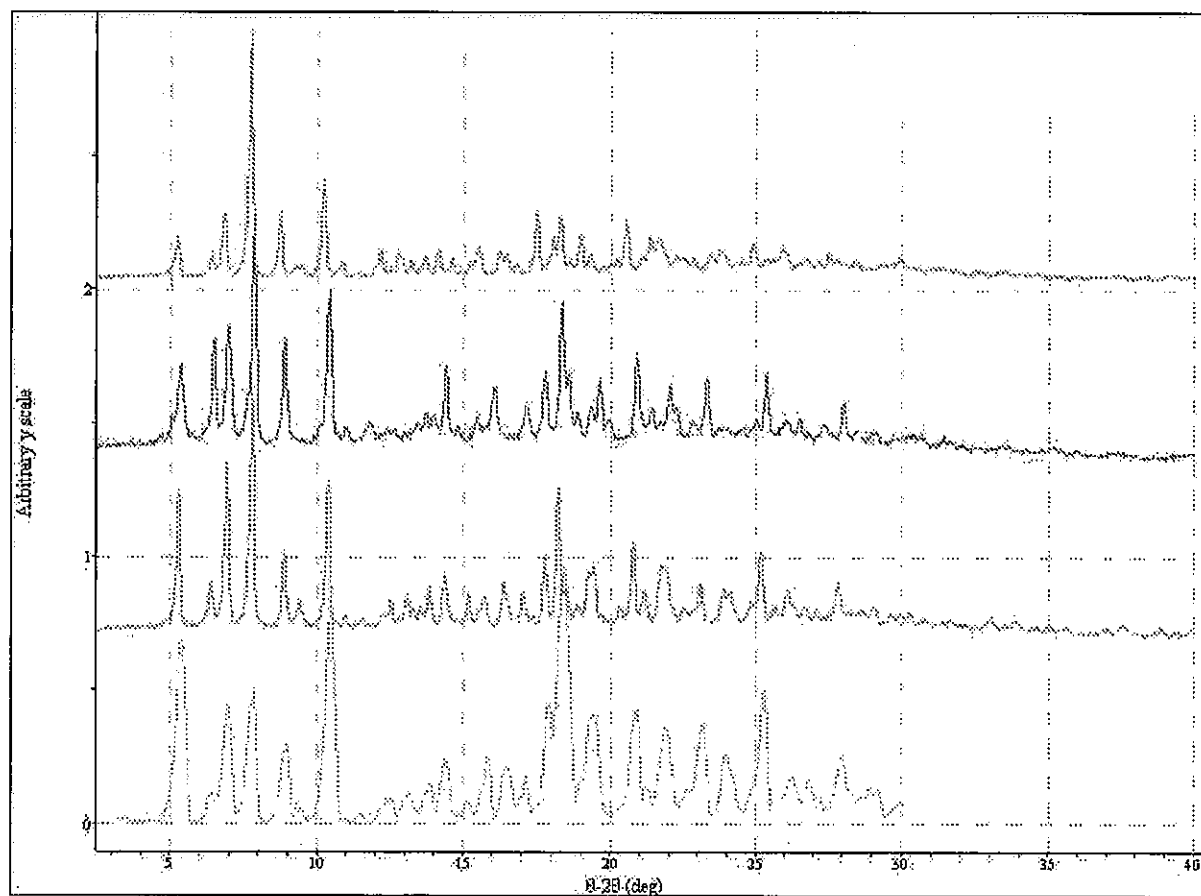
First: Rifaximin Form β -1Second: Rifaximin Form β -2Third: Rifaximin Form β Fourth: Rifaximin Reference Form β (US Patent Application US 2005/0272754 A1. Dated Dec. 8, 2005)

Figure 39

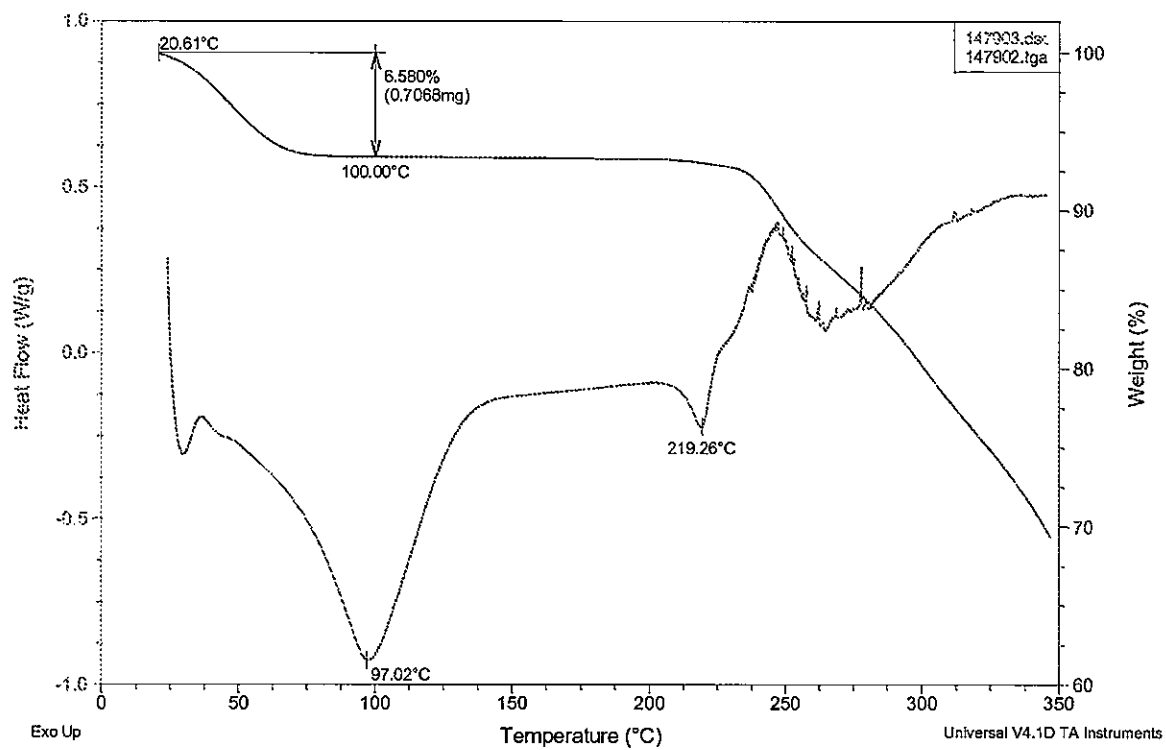
TGA and DSC of Rifaximin form β -2

Figure 40

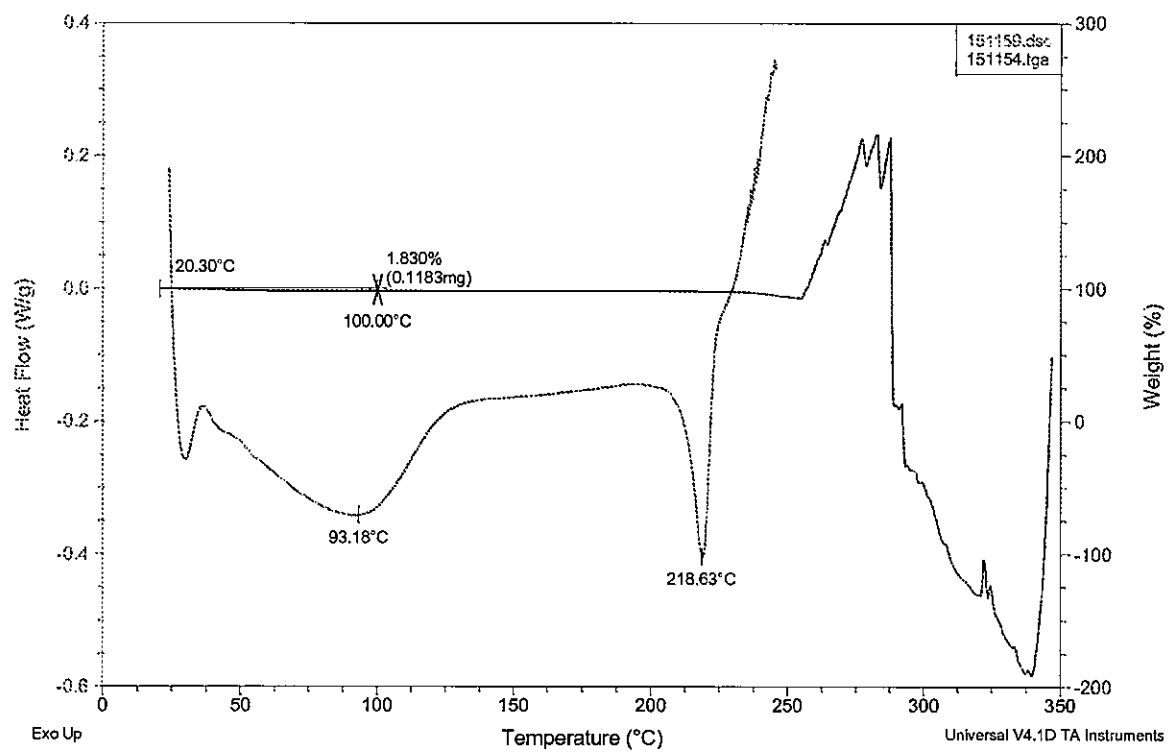
TGA and DSC of Rifaximin form ϵ dry

Figure 41**Comparison of XRPD Patterns of Rifaximin Form ε dry, ε , and Reference Pattern ε**

Top to bottom:

First: Form ε drySecond: Form ε Third: Form ε reference, European Patent Application No. 05 004 695.2, dated March 3, 2005.