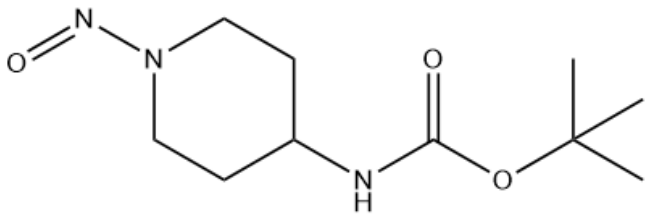
KAARIS LABS
Delivering Scientific Excellence

Certificate of Analysis

Catalogue Number
KL-06-00305

Lot Number
KLP0043AJ01

Structure



Product Name

Linagliptin Nitroso Impurity 5

Synonyms

Tert-butyl (1-nitrosopiperidin-4-yl)carbamate

CAS Number
2396758-93-1

Molecular Formula
$C_{10}H_{19}N_3O_3$

Molecular Weight
229.3 g/mol

Mfg. Date
08-10-2025

Re-Test Date
06-10-2028

Shipping Condition

All Product are stable to be shipped at room temperature, unless otherwise specified.

Long Term Storage Conditions

2°C ~ 8°C Protected from light and Sealed

Analytical Information

Test	Specifications	Results
Appearance	Pale Yellow Solid	Pale Yellow Solid
Solubility	Soluble in DMSO, Methanol	Conforms
Purity by HPLC	Not less than 90.00%	99.01%
Identification by ^{1}HNMR	Conforms to structure	Complies
Identification by Mass	Conforms Molecular Weight	Complies
Identification by IR	Conform functional groups	Complies
Weight Content By TGA	Not specified	0.496%
Residue of Ignition By TGA	Not specified	0.000%
Potency	Not specified	98.52%

Prepared by

Reviewed & Approved by

KAARIS RESEARCH LABS PRIVATE LIMITED HYD

Note: Use for research & analytical purpose only. Not for human consumption

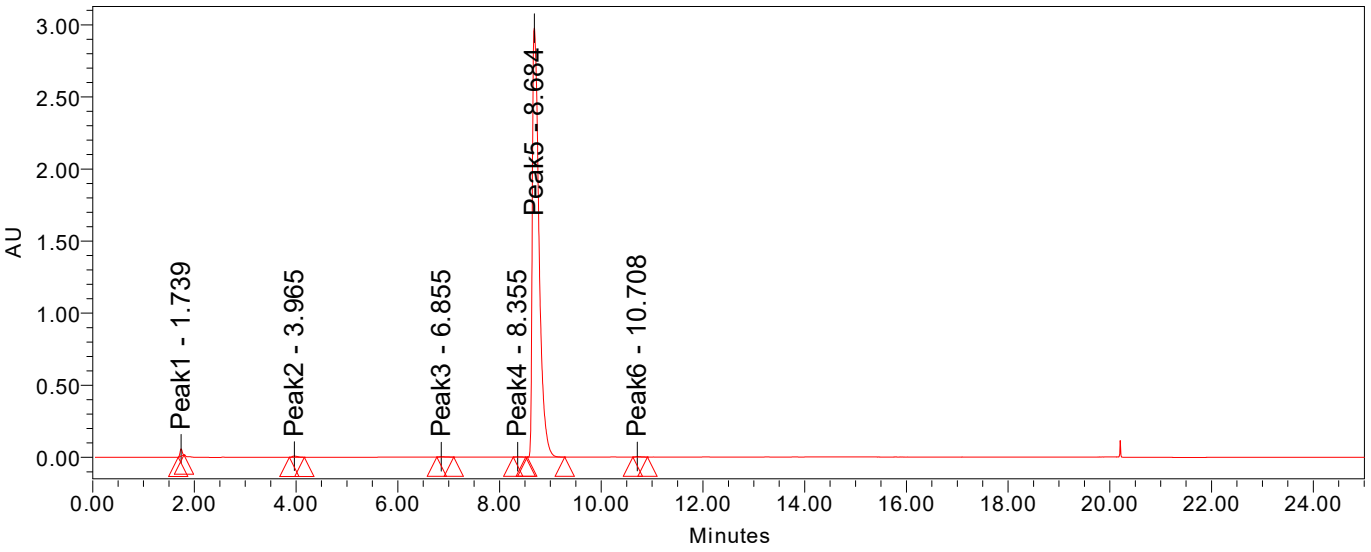
Empower 3 SOFTWARE

SAMPLE INFORMATION

Sample Name:	KLP0043AJ01	Acquired By:	ACCUHPLC
Sample Type:	Unknown	Sample Set Name:	08102025002_RS BY HPLC
Vial:	58	Acq. Method Set:	ACCU_GEN_HPLC_METHOD_
Injection #:	1	Processing Methoc	ACCU_Gen Process method
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	25.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998
Date Acquired:	08-10-2025 20:12:48 IST		
Date Processed:	08-10-2025 21:08:29 IST		

COLUMN :- NEUROSYIL C18 (4.6 *150mm , 5µm)

Auto-Scaled Chromatogram



Peak Results

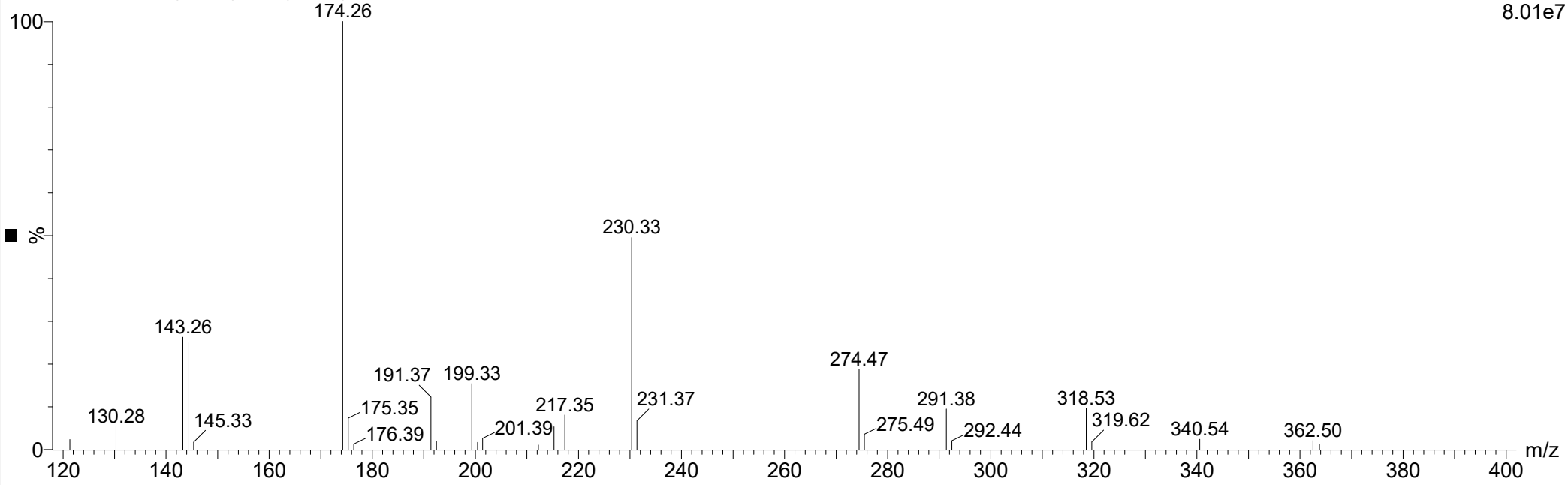
	Name	RT	Height	Area	% Area
1	Peak1	1.74	50476	148110	0.54
2	Peak2	3.96	8113	58796	0.21
3	Peak3	6.86	2998	26579	0.10
4	Peak4	8.36	2142	15392	0.06
5	Peak5	8.68	2975585	27275380	99.01
6	Peak6	10.71	3286	23652	0.09

KLP0043AJ01

08-Oct-2025
19:42:37

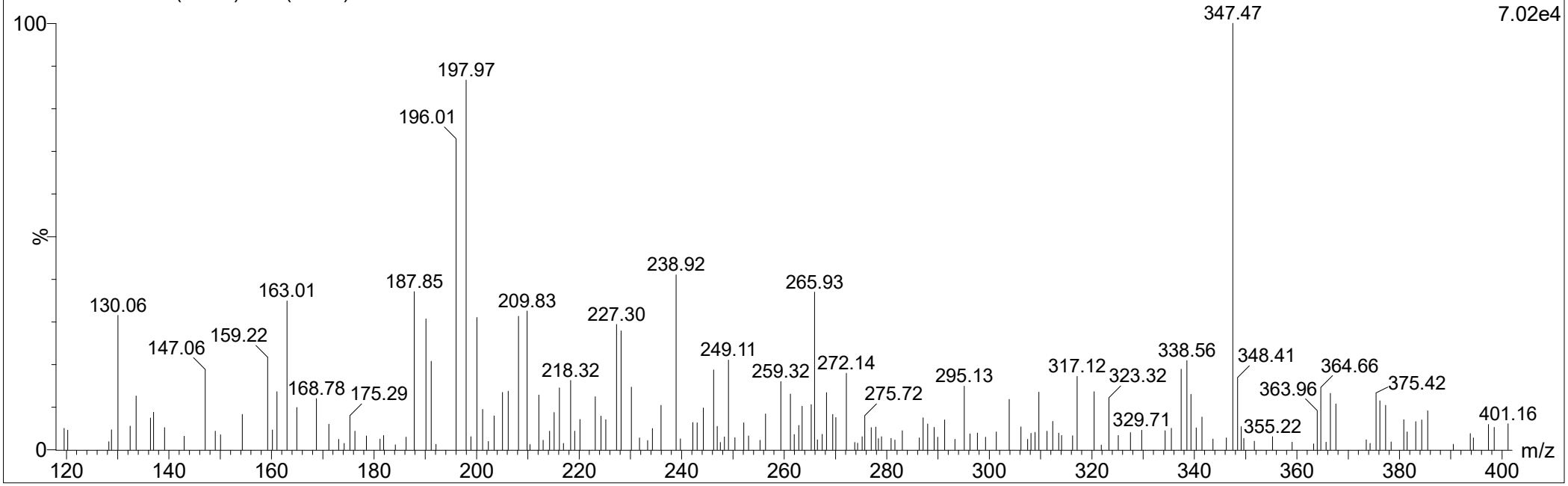
KLP0043AJ01 15 (0.251) Cm (15:18)

1: Scan ES+
8.01e7



KLP0043AJ01 15 (0.260) Cm (14:17)

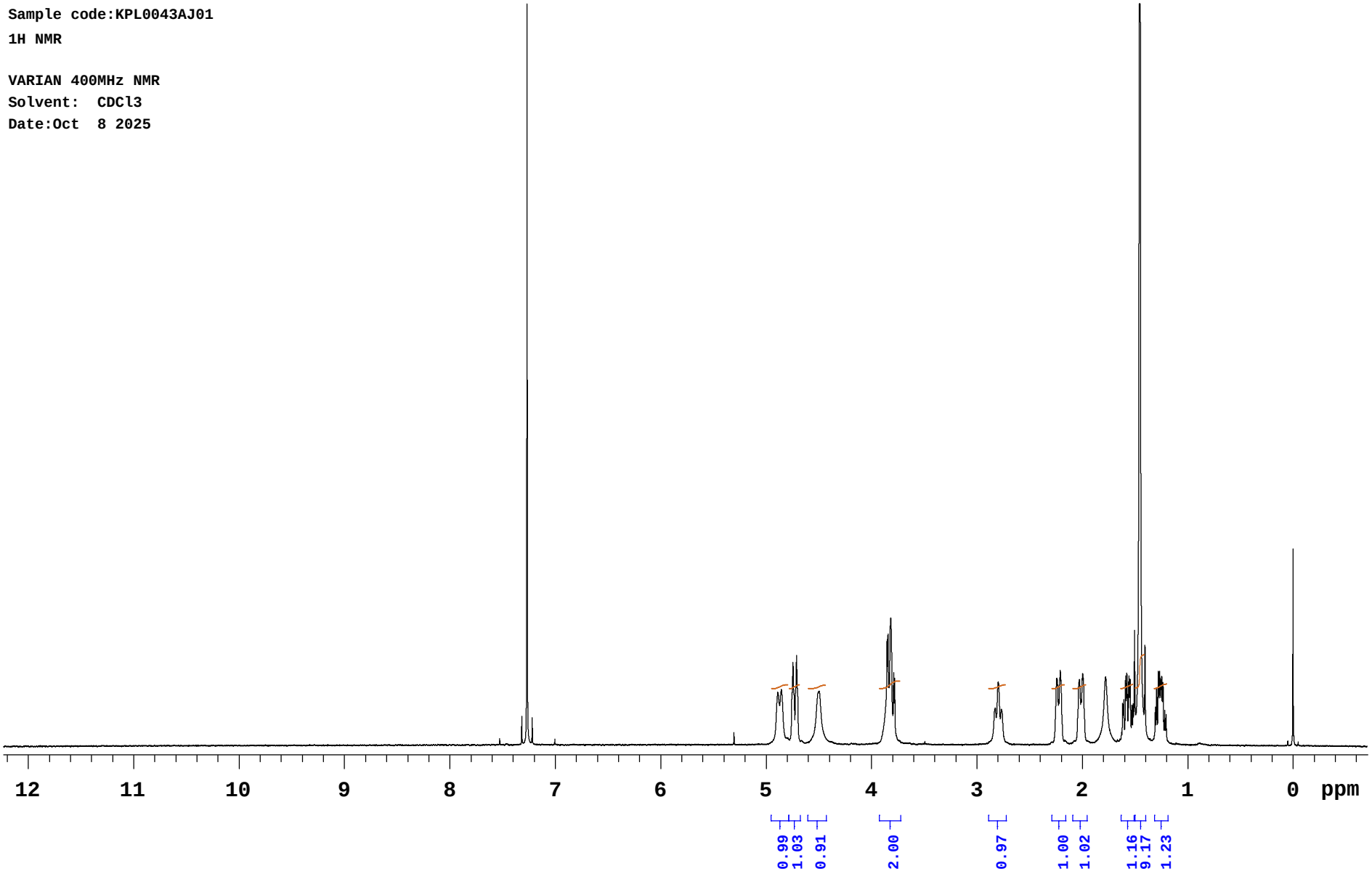
2: Scan ES-
7.02e4



Sample code:KPL0043AJ01

1H NMR

VARIAN 400MHz NMR
Solvent: CDCl3
Date:Oct 8 2025

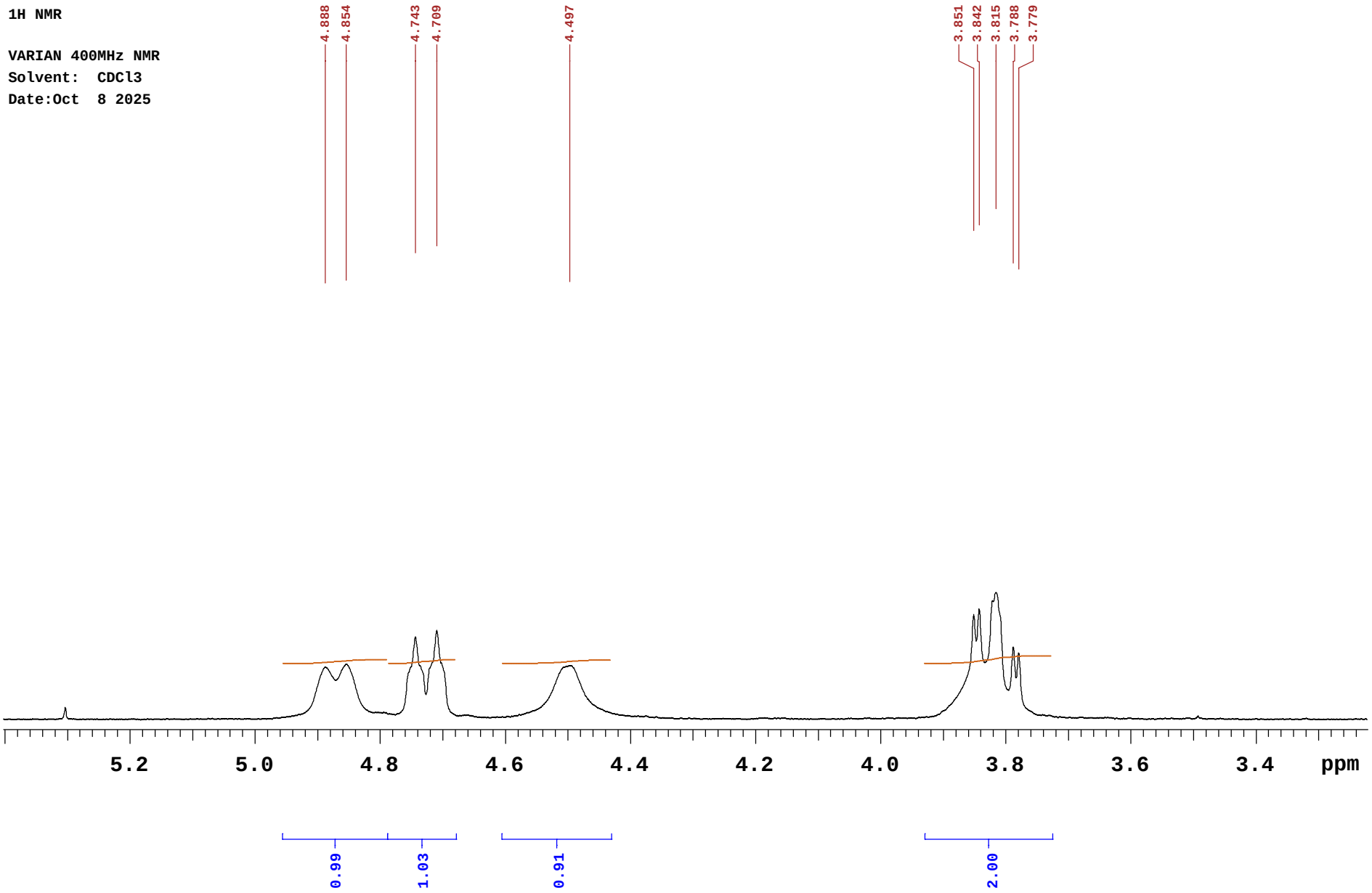


Plotname: KPL0043AJ01_PROTON_01_plot01

Sample code:KPL0043AJ01

1H NMR

VARIAN 400MHz NMR
Solvent: CDCl3
Date:Oct 8 2025



Plotname: KPL0043AJ01_PROTON_01_plot02

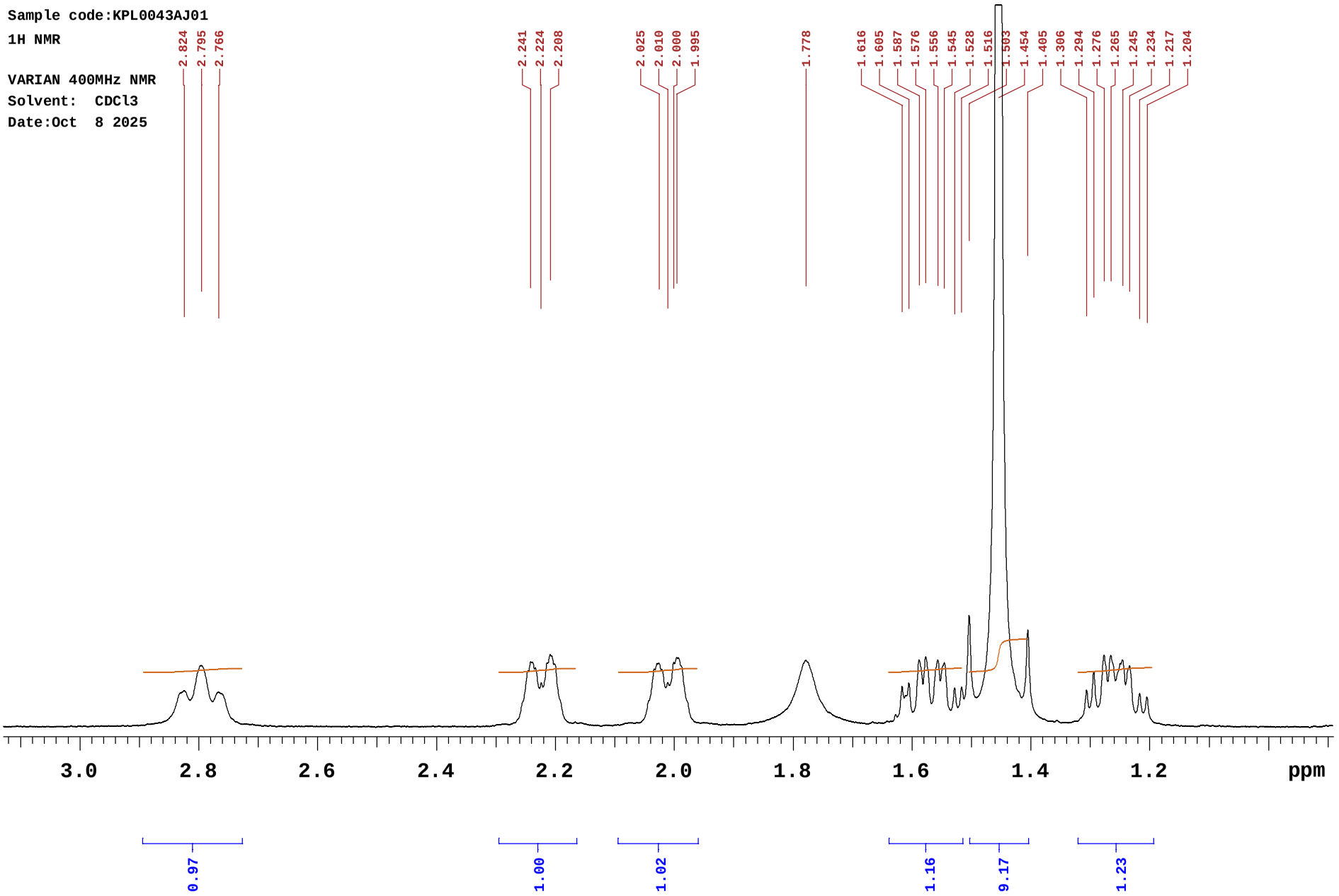
Sample code:KPL0043AJ01

1H NMR

VARIAN 400MHz NMR

Solvent: CDCl3

Date:Oct 8 2025



Plotname: KPL0043AJ01_PROTON_01_plot03

Sample code:KPL0043AJ01

1H NMR
VARIAN 400MHz NMR

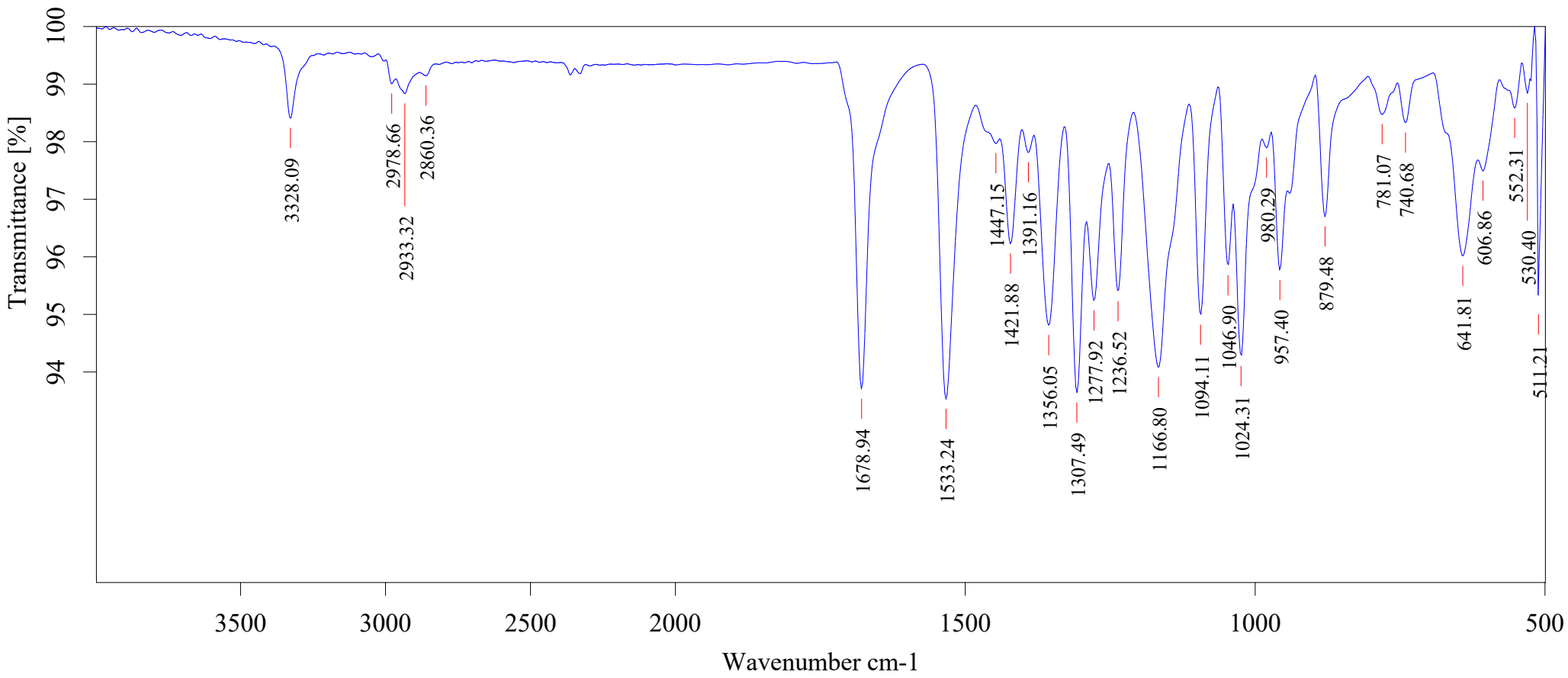
Solvent: CDCl3

Date:Oct 8 2025

INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT
1	2924.4	7.316	5.0	35	561.5	1.405	17.9
2	2904.4	7.267	207.7	36	522.0	1.306	6.7
3	2884.7	7.217	4.7	37	517.2	1.294	10.1
4	1953.6	4.888	9.4	38	510.2	1.276	13.2
5	1940.2	4.854	9.9	39	505.6	1.265	13.2
6	1895.9	4.743	14.9	40	497.7	1.245	12.3
7	1882.4	4.709	16.1	41	493.1	1.234	11.2
8	1797.3	4.497	9.6	42	486.3	1.217	6.1
9	1539.3	3.851	18.9	43	481.2	1.204	5.3
10	1535.7	3.842	20.0	44	0.0	0.000	35.5
11	1525.0	3.815	22.9				
12	1514.0	3.788	13.0				
13	1510.5	3.779	11.9				
14	1128.6	2.824	6.5				
15	1117.2	2.795	11.3				
16	1105.6	2.766	6.3				
17	895.8	2.241	11.9				
18	888.8	2.224	8.0				
19	882.6	2.208	13.3				
20	809.4	2.025	11.7				
21	803.5	2.010	8.1				
22	799.6	2.000	11.8				
23	797.6	1.995	12.8				
24	710.8	1.778	12.2				
25	646.1	1.616	7.4				
26	641.5	1.605	8.0				
27	634.5	1.587	12.4				
28	630.1	1.576	12.8				
29	622.0	1.556	12.3				
30	617.6	1.545	11.8				
31	610.6	1.528	7.0				
32	606.0	1.516	7.3				
33	600.9	1.503	20.7				
34	581.2	1.454	685.4				

Instrument ID No: AA-ID-002

Accu Analytical



Sample Name:KLP0043AJ01

Lot No./Batch No:

Date & Time:10-10-2025,16:39:42

Operator Name:Accu Chemist

Experiment:IR-34.xpm

Resolution:4

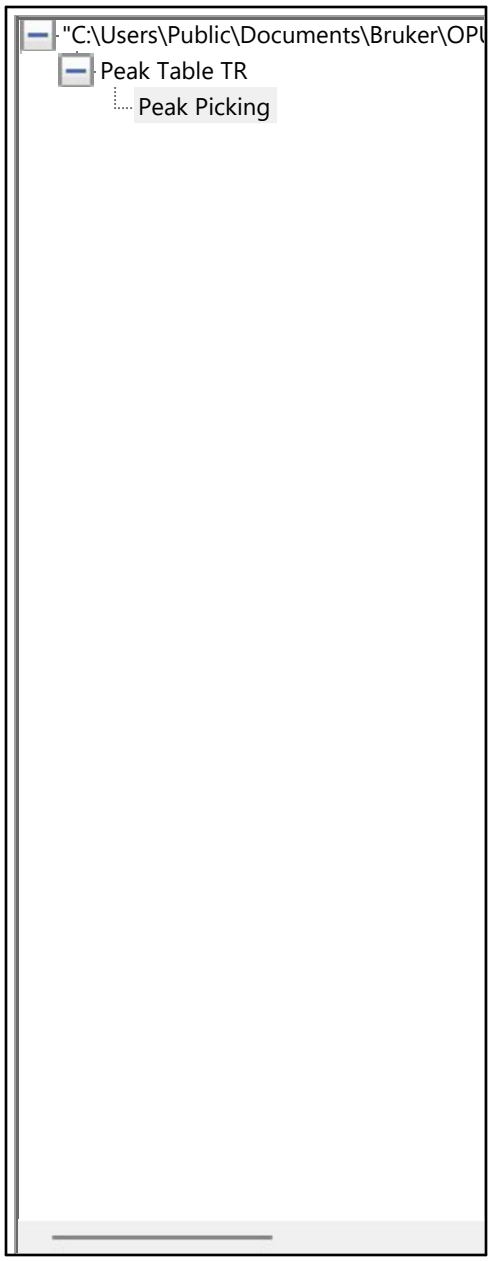
Sample Scans:16

Frequency Range:4000 to 500

Analysed by:
Date:

10-10-2025 16:41:19

Checked by:
Date:



Peak Picking	Values
Method:	Standard
Searched for minima:	Yes
Number of peaks:	31
Sensitivity > [%]:	5.000000
From:	3981.400000
to:	432.275477
Absolute peak height >	0.000000
Relative peak height < [%]	0.000000
Absolute peak height <	0.000000

Wavenumber	Abs. intensity	Rel. intensity	Width	Found if threshold <	Shoulder
3328.0896	0.984	0.012	36.7582	17.701286	0
2933.3191	0.988	0.007	93.0943	9.029575	0
1678.9376	0.937	0.057	22.4148	87.158936	0
1533.2351	0.935	0.065	31.9165	100.000549	0
1421.8838	0.962	0.021	18.8953	30.712950	0
1356.0548	0.948	0.035	26.2794	53.433643	0
1307.4904	0.936	0.052	22.7530	77.158882	0
1277.9167	0.952	0.017	15.5772	21.310963	0
1236.5239	0.954	0.026	16.6328	34.478218	0
1166.7968	0.941	0.045	43.7635	68.522064	0
1094.1068	0.950	0.038	18.0800	56.634174	0
1046.8955	0.958	0.018	682.6497	16.507360	0
1024.3145	0.943	0.048	22.4001	72.438782	0
957.4001	0.958	0.025	16.7209	37.085743	0
879.4806	0.967	0.025	17.7020	38.062206	0
781.0687	0.985	0.006	21.6495	8.493377	0
740.6819	0.983	0.008	16.3616	12.466073	0
641.8109	0.960	0.034	41.9168	49.164032	0
552.3103	0.986	0.009	43.0783	7.688526	0
530.3984	0.988	0.008	27.8906	8.327195	0
2978.6596	0.990	0.001	2496.1678	12.348485	0

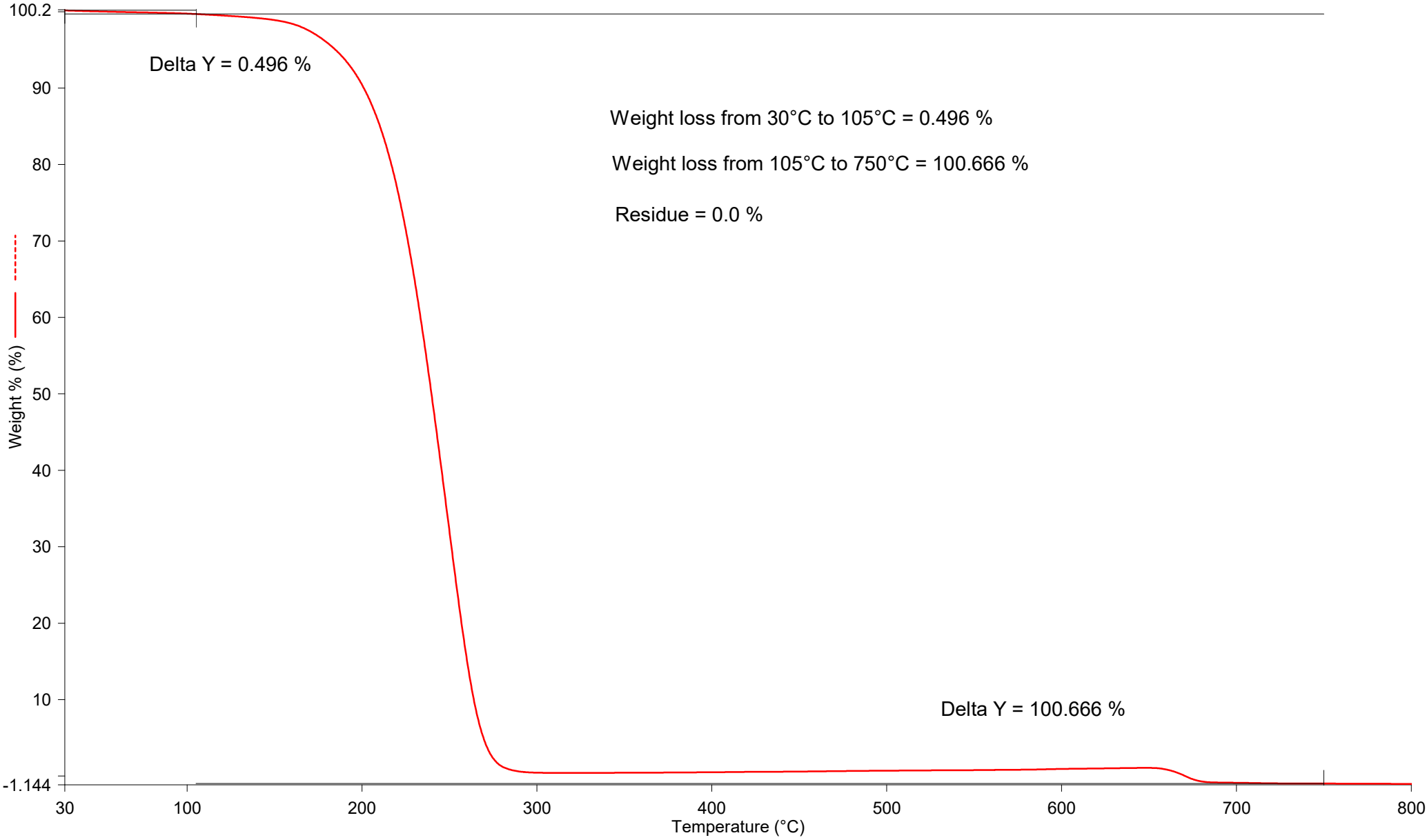
C:\Users\Public\Documents\Bruker\OPUS_8.7.31\MEAS\KLP0043AJ01.0 KLP0043AJ01

Peak Picking Values

Wavenumber	Abs. intensity	Rel. intensity	Width	Found if threshold <	Shoulder
2860.3568	0.991	0.001	137.7449	10.726460	0
1391.1565	0.978	0.003	11.2655	8.800052	0
1447.1479	0.980	0.002	981.5907	2.364618	0
1307.4904	0.936	0.052	22.7530	108.221825	0
1024.3145	0.943	0.048	22.4001	100.658600	0
980.2893	0.979	0.002	82.7928	3.488729	0
957.4001	0.958	0.025	16.7209	49.313332	0
606.8618	0.975	0.004	31.5040	5.779744	0
511.2130	0.952	0.041	8.1309	69.703270	0
511.2130	0.952	0.041	8.1309	69.703270	0

C:\Users\Public\Documents\Bruker\OPUS_8.7.31\MEAS\KLP0043AJ01.0 KLP0043AJ01

Filename:	D:\TGA RAW DATA\KAARIS\O...\KLP0043AJ01.t6d
Data Collected:	11-10-2025 12:54:24
Operator ID:	ACCU
Sample ID:	KLP0043AJ01
Sample Weight:	2.800 mg
Comment:	NA



11-10-2025 13:02:01

1) Heat from 25.00°C to 600.00°C at 20.00°C/min

2) Heat from 600.00°C to 860.00°C at 20.00°C/min