ION-38250-14 FR

Contract No. NAS8-38250-14

REPORT

Final Report

Spacelab Charcoal Analyses - Phase II

To

Ion Electronics

6767 Madison Pike

Huntsville, AL 35806

January 20, 1995

Battelle

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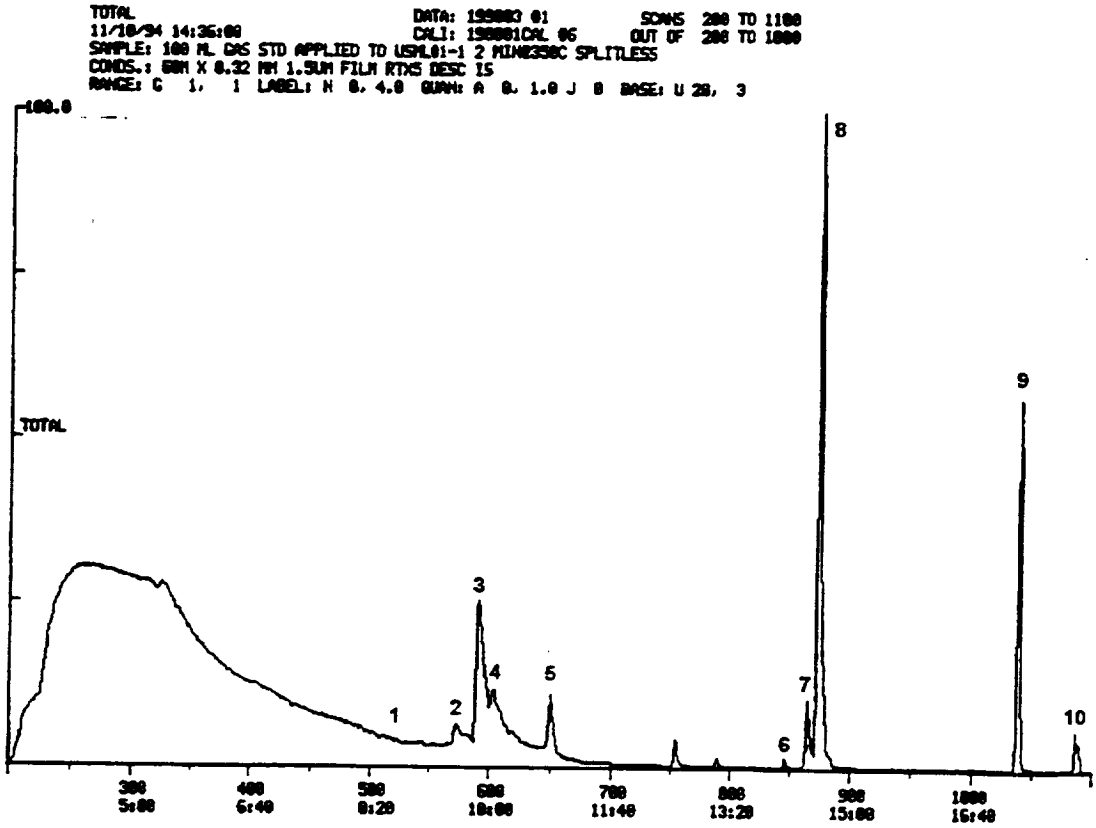

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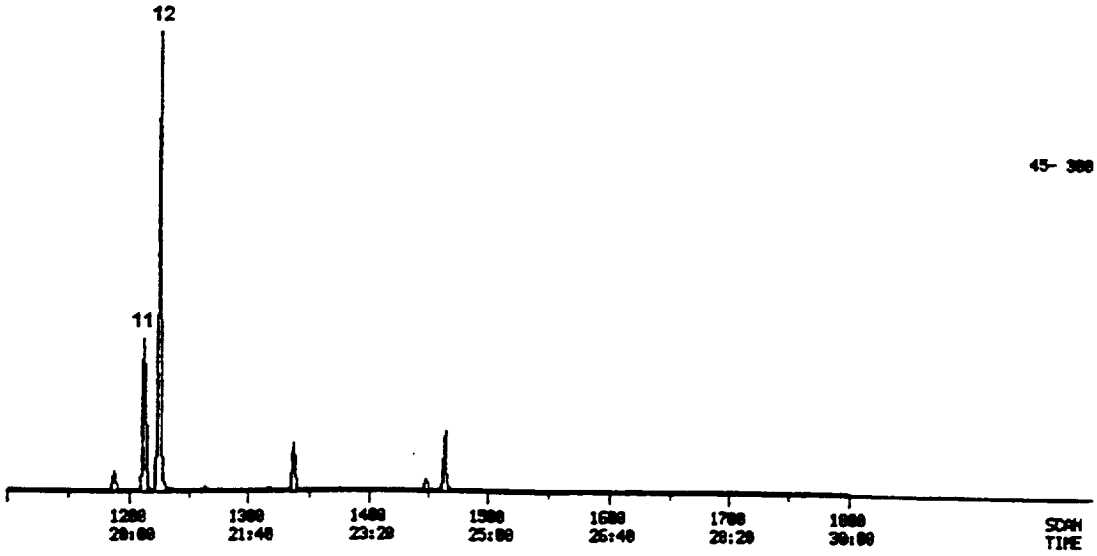

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to

ION Electronics
Contract No. NAS8-38250-14

January 20, 1995

by

L.E. Slivon, L.A. Hernon-Kenny,
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Introduction

This report describes analytical methods and results obtained from chemical analysis of 31 charcoal samples in five sets. Each set was obtained from a single scrubber used to filter ambient air on board a Spacelab mission. Analysis of the charcoal samples was conducted by thermal desorption followed by gas chromatography/mass spectrometry (GC/MS). All samples were analyzed using identical methods. Two of the mission sample sets (IML, USML) were analyzed previously by Battelle (Contract No. 38250-06) using a similar method, however that method was unable to detect very volatile and/or very polar compounds. The method used for these analyses was able to detect compounds independent of their polarity or volatility.

In addition to the charcoal samples, Battelle was requested and authorized under Contract Modification No. 5 to conduct analyses of three ECLSS water samples received on December 15, 1994 specifically for trimethylamine.

Because of the number of samples and compounds identified, results from the charcoal analyses are provided in Appendix A together with supporting GC/MS total ion chromatograms. Results from Trimethylamine analyses on the three ECLSS water samples are provided in the Results and Discussion section of this report.

Technical Approach

Charcoal Samples

Table 1 identifies the charcoal samples analyzed under this contract. As indicated earlier, charcoal from the IML and USML missions was analyzed previously by Battelle and was maintained in glass jars at room temperature from date of receipt. The charcoal type shown in Table 1 was not indicated on the samples but was presumed by Battelle staff based on the sample numbers, discussions with ION personnel and prior documentation received on

on the sample numbers, discussions with ION personnel and prior documentation received on charcoal samples. Also included in these analyses was a sample of clean activated charcoal provided by Battelle that was stored with the IML and USML samples from the date of receipt. This "method blank" material is not identified in Table 1 but is represented in subsequent results tables and in the data of Appendix A.

Table 1. Identification of Charcoal Samples

Sample Identification	Date Received	Presumed Charcoal Type	Estimated Total Weight, g.
IML-1 #1	3/1/93	2% Platinum	213
IML-1 #2	3/1/93	Acid Washed	1523
IML-1 #3	3/1/93	Activated Carbon	285
IML-1 #4	3/1/93	Activated Carbon	499
IML-1 #5	3/1/93	Activated Carbon	493
USML-1 #1	4/15/93	2% Platinum	348
USML-1 #2	4/15/93	Acid Washed	1767
USML-1 #3	4/15/93	Activated Carbon	453
USML-1 #4	4/15/93	Activated Carbon	453
USML-1 #5	4/15/93	Activated Carbon	453
SLJ-1 #1	5/5/94	2% Platinum	362
SLJ-1 #2	5/5/94	Acid Washed	1750
SLJ-1 #3	5/5/94	Activated Carbon	506
SLJ-1 #4	5/5/94	Activated Carbon	503
SLJ-1 #5	5/5/94	Activated Carbon	501
SLD-2 #1	5/5/94	2% Platinum	396
SLD-2 #2	5/5/94	Acid Washed	1826
SLD-2 #3	5/5/94	Activated Carbon	456
SLD-2 #4	5/5/94	Activated Carbon	472
SLD-2 #5	5/5/94	Activated Carbon	453
P1-STS-58 (SLS-02)	5/5/94	2% Platinum	114
P2-STS-58	5/5/94	2% Platinum	113

Sample Identification	Date Received	Presumed Charcoal Type	Estimated Total Weight, g.
P3-STS-58	5/5/94	2% Platinum	113
AW1-STS-58	5/5/94	Acid Washed	714
AW2-STS-58	5/5/94	Acid Washed	716
AW3-STS-58	5/5/94	Acid Washed	717
ACT1-STS-58	5/5/94	Activated Carbon	605
ACT2-STS-58	5/5/94	Activated Carbon	612
ACT3-STS-58	5/5/94	Activated Carbon	612
ACT4-STS-58	5/5/94	Activated Carbon	614
ACT5-STS-58	5/5/94	Activated Carbon	612

The analysis method used for these samples was thermal desorption coupled on line to a gas chromatograph/mass spectrometer system. The specific instrumentation and operating conditions are summarized in Table 2. Unlike previous analyses, a dry purge was not conducted prior to thermal desorption, nor was a Nafion in-line dryer used to remove water vapor desorbed from the charcoal. The impact of water vapor on the analysis was significant but was minimized to the extent possible by reducing the quantity of sample actually analyzed.

To improve quantitative accuracy, standard mixtures were prepared containing known concentrations of selected compounds that were among the most abundant in previous scrubber charcoal analyses including those conducted at Battelle. This standard mixture was analyzed for purposes of calibration by direct splitless injection into the GC/MS system or for purposes of estimating recovery by spiking onto a charcoal sample followed by thermal desorption GC/MS. Initial trials using solvent based spikes onto previously desorbed charcoal samples were not successful because the solvent created excessive peak broadening rendering identification and quantification difficult. To overcome this problem, a pressurized gas standard was prepared whose composition is shown in Table 3. This gas standard was

used both for direct injection to single point calibrate the GC/MS system, and for loading previously desorbed "blank" charcoal samples for purpose of estimating recovery.

Table 2. Instrumentation and Analysis Parameters

Charcoal Analyses	
Thermal Desorber:	Scientific Instrument Services Short Path Thermal Desorber, Model TD-2
Dry Purge:	None
Desorb Temperature:	300°C
Desorb Flow:	5 mL/min
Desorb Time:	3 min
GC/MS System:	Finnigan Model 4500
GC Column:	Restek RTX-5, 60 m x 0.32 mm ID, 0.5μm film thickness
Initial Temperature:	-20°C, 6 min
Temprature Program:	-20°C to 20°C, 50°C/min 20°C to 300°C, 10°C/min
Ionization:	EI, 70eV @ 0.35 ma
MS Scan Range:	29 to 300 Da, 1.0 sec per cycle
Water Analyses (Trimethylamine)	
Instrument:	PE-Sciex API III Tandem Mass Spectrometer
Sample Introduction:	500 μL, Flow Injection (No Chromatographic Column)
Mobile Phase:	Water, 1.2 mL/min
LC/MS Interface:	Direct Vaporization (Battelle Vaporjet, 180°C)
Ionization:	Corona Discharge, 3 ma, APCI
Operating Mode:	Selected Ion Reaction Monitoring
Parent Ion:	m/z 60 (Protonated Molecular Ion)
Daughter Ions:	m/z 44, m/z 45
Dwell Time:	658 msec
Collision Energy (E_{LAB}):	25 eV
Target Thickness:	Argon, 350 x 10^{12} cm^{-2}

Table 3. Composition of Standards Gas Cylinder

Compound	Concentration ng/mL
Ethanol	30
Isopropanol	30
Acetone	30
2-Ethoxyethyl acetate	10
Benzene	10
Toluene	10
o-Xylene	10
Cyclohexane	10
Dibromochloromethane	10
Trichlorofluoromethane (Freon 11)	10
1,1,2-Trichloro-1,2,2-trifluoro methane (Freon 113)	10
1,1,1-Trichloroethane	10
Butanol	10

Water Samples

Trimethylamine (TMA) analyses were conducted by direct aqueous flow injection combined with tandem mass spectrometry. No sample preparation was necessary. The instrument and configuration are summarized in Table 2. The tandem mass spectrometer is a PE-Sciex API III configured with a corona discharge atmospheric pressure chemical ionization (APCI) ion source and a proprietary Battelle interface which vaporizes the flow injected carrier (mobile phase) prior to its entry into the APCI ion source. Water vapor serves as the predominant reagent gas resulting in protonation of TMA (m/z 60). Ions of

this mass are isolated by the first mass analyzer and subjected to collisional activated dissociation (CAD) using argon as a low pressure inert target. Two characteristic daughter ions (fragment ions) are monitored for TMA (m/z 44, 45). The ratio of the daughter ions serves as a highly selective qualitative feature while the daughter ion response serves as a means for quantification.

Results and Discussion

Charcoal Samples

Initial testing was concerned with quantifying our ability to recover the standard compounds in the cylinder gas standard from the charcoal samples. One sample representing each type of charcoal was thermally desorbed for 20 min., allowed to cool, then spiked with 100 mL (measured electronically as standard cm^3) then analyzed under the conditions anticipated for sample analysis. A backup trap was attached to the exit of the "sample" to detect any breakthrough of analytes from the carbon sample. No target analytes were found in any of the backup traps. Results from these analyses of the spiked charcoal samples are summarized in Table 4. Percent recovery for each analyte was based upon the total ion current in the background subtracted mass spectrum for the spiked charcoal sample divided by an equivalent total ion current value obtained by direct injection into the GC of the cylinder gas standard. Low recovery was evident in some cases. As an example, ethanol and isopropanol were poorly recovered from the untreated and platinum charcoal samples. These results suggest that longer desorption times may be a factor to more efficiently recover these compounds, however on separate trials with unconditioned samples we observed that longer desorption times contributed to degradation of chromatographic resolution presumably as a result of additional water introduced to the GC column.

Table 4. Recovery of Standards Spiked onto Different Charcoal Types[1]

Compound	Spike Loading, micrograms	% Recovery SLD2 #5 (Untreated)	% Recovery USML1 #2 (Acid Washed)	% Recovery USML1 #1 (Platinum)
Ethanol	3.0	3.3	19.0	2.4
Isopropanol	3.0	4.7	18.2	5.9
Acetone	3.0	12.4	37.8	35.0
2-Ethoxyethyl acetate	1.0	6.6	67.2	55.8
Benzene + Cyclohexane [2]	1.0	25.3	54.2	52.5
Toluene	1.0	31.5	47.6	33.1
o-Xylene	1.0	27.6	35.9	45.2
Dibromochloromethane	1.0	2.5	30.7	15.2
Trichlorofluoromethane (Freon 11)	1.0	16.8	43.6	14.6
1,1,2-Trichloro-1,2,2-trifluoromethane (Freon 113)	1.0	21.2	53.7	26.1
1,1,1-Trichloroethane	1.0	15.8	51.9	27.6
Butanol	1.0	33.4	28.1	73.8

1. See text for details.

2. Benzene and Cyclohexane were not chromatographically resolved under the conditions of analysis in either the spiked charcoal samples or the standard from which recovery is based.

Gravimetric results for each of the charcoal samples analyzed are summarized in Table 5. included in Table 5 are the original weight of sample desorbed, as well as percent weight loss presumably due to water vapor. Except for IML and USML charcoal samples, all

samples within a mission set show comparable water content with a slight positive bias in the acid washed and platinum loaded charcoals. This trend is not observed in the older IML and USML samples which, despite precautions for maintaining a hermetic seal, may have gained or lost water during storage. The two "Blank" samples shown in Table 5 were each aliquots of a single laboratory charcoal sample stored with IML and USML samples. The relatively low water content of this charcoal combined with good agreement in these replicate analyses indicate that the water content of the samples is substantial and that these measurements are reproducible.

Table 5. Weight of Sample Analyzed and Estimated Percent Water.

Sample Identification	Weight Desorbed, g.	Weight Loss, g.	Weight Loss, Percent[1]
IML-1 #1	0.1432	0.0254	17.7
IML-1 #2	0.1063	0.0197	18.5
IML-1 #3	0.1133	0.0494	41.4
IML-1 #4	0.1158	0.0097	8.4
IML-1 #5	0.1611	0.0954	59.2
USML-1 #1	0.1377	0.0253	18.4
USML-1 #2	0.2263	0.0374	16.5
USML-1 #3	0.1655	0.0214	12.9
USML-1 #4	0.1769	0.0154	8.7
USML-1 #5	0.1142	0.0109	9.5
SLJ-1 #1	0.1219	0.0236	19.4
SLJ-1 #2	0.1823	0.0359	19.7
SLJ-1 #3	0.1357	0.0152	11.2
SLJ-1 #4	0.1263	0.0134	10.6
SLJ-1 #5	0.1171	0.0132	11.3
SLD-2 #1	0.1076	0.0259	24.1

Sample Identification	Weight Desorbed, g.	Weight Loss, g.	Weight Loss, Percent[1]
SLD-2 #2	0.1095	0.0244	22.3
SLD-2 #3	0.1003	0.0208	20.7
SLD-2 #4	0.1242	0.0282	22.7
SLD-2 #5	0.1154	0.0246	21.3
P1-STS-58 (SLS-02)	0.1194	0.0313	26.2
P2-STS-58	0.1426	0.0356	25.0
P3-STS-58	0.1694	0.0414	24.4
AW1-STS-58	0.1772	0.0402	22.7
AW2-STS-58	0.1509	0.0355	23.5
AW3-STS-58	0.1280	0.0277	21.6
ACT1-STS-58	0.1666	0.0375	22.5
ACT2-STS-58	0.1816	0.0421	23.2
ACT3-STS-58	0.1262	0.0303	24.0
ACT4-STS-58	0.1112	0.0245	22.0
ACT5-STS-58	0.1037	0.0228	22.0
BLANK #1	0.1175	0.0100	9.4
BLANK #2	0.1058	0.0096	9.1

[1] Measured weight loss is presumed to be almost entirely from adsorbed water.

Chromatographic and tabular results are provided in Appendix A for one of the Blank charcoal analyses and the three spiked charcoal samples described above. Note that the data in Appendix A is organized so that tabular and chromatographic data for the same sample are on facing pages. Following these data are tabular and chromatographic results from one analysis of each unspiked sample. All of the chromatographic data in Appendix A were

acquired under the same thermal desorption and chromatographic conditions. Additional analyses, for example split injections from the charcoal to the chromatographic column, were carried out in some cases for diagnostic purposes to better interpret (qualitatively) chromatographic or mass spectral results. Sample analysis results provided in Appendix A are represented as the identified compound, an RIC value corresponding to the total ion current response, the measured concentration for that compound, and in those cases where the identified compound was one of those in our gas standard, a corrected concentration. The corrected concentration was calculated as the measured concentration divided by the fractional recovery of that compound from the same type of charcoal.

Sample #5 contained the most compounds and highest concentrations in both the IML and USML sample sets. These results are consistent with their presumed most forward location in the scrubber. A decrease is observed in the methylene chloride concentration with decreasing sample number in both sample sets, consistent with expectation. The results obtained from these analyses identify some of the same compounds but at approximately 10 fold lower concentration. Some of the compounds identified, for example acetone in USML #5 were not present in subsequent samples. Many of the compounds identified from re-analyses of the IML and USML sample sets were previously identified in these samples, but now at significantly lower concentration. This difference may represent loss of analyte because of sample age or may be the result of excess water co-introduced into the chromatographic system.

Results from the SLD and SLJ sample sets show similar trends in that Sample #5 was in each case the most heavily loaded with organic compounds. The lowest concentrations were observed in the #1 samples however a declining trend in concentration from the first to the last charcoal sample in the collection sequence is not clear. Some of the compounds, for example methylene chloride in the SLD samples, show an erratic distribution that does not appear to be correlated to their position in the scrubber. Methylene chloride may be an artifact of sample recovery or storage prior to delivery at Battelle. This compound is not present in Battelle's method blank charcoal that was stored with the samples. The high

concentration of isopropanol in SLJ-1 #5 may be a contamination artifact because it would be expected to be present in succeeding samples of that set. The STS-58 samples revealed high concentrations of organic compounds in the activated charcoal (AC5 through AC1) with an apparent maximum concentration in AC3. As expected, lesser concentrations were observed in the acid washed charcoal samples (AW3 through AW1) and even lower concentrations in the Platinum loaded charcoals (P3 through P1).

Water Samples

Figure 1 provides the actual signal response obtained for each of the reaction monitoring channels (60/44 and 60/45) resulting from flow injection of a water blank, a 75 ng/mL standard, a 149 ng/mL standard and two injections of a 372 ng/mL standard. Both channels are recorded nearly simultaneously by alternating acquisition of the two specific daughter ions of TMA. The key elements of the TMA signature are the presence of the two daughter ions and the near equivalence of their relative abundance. The Ion transition at the m/z 44 daughter ion (60/44) was used for quantification. The resulting TMA calibration curve is shown in Table 2. Results obtained from analysis of the three ECLSS water samples are summarized in Table 6. Our limit of detection for this compound in water is 75 ng/mL, and is supported by a calibration standard whose results are distinguishable from zero. Included in Table 6 are preliminary results from electrospray ionization trials that provided unconfirmed evidence of sodium cation and iodide anion in selected samples. One of the samples contained TMA at the limit of detection while another was approximately three times this concentration. The third sample provided a suggestive response but was below that of our lowest standard and is therefore not detected. Graphical results from analyses of these samples are shown in Figures 3 through 5. In each case, three injections were made corresponding to a water blank, the ECLSS sample diluted by a factor of 5, and finally the undiluted ECLSS sample. Injection of the diluted sample was a precaution to avoid potentially overloading the ion source. In all but the non-detect case, WRT-ST9-0108-0-CETA-127-T-MFS, a clear response is observed for TMA that is greater than the water

blank or the diluted sample, and with a daughter ion abundance ratio consistent with that from the calibration standards.

Table 6. Trimethylamine Analysis Results for Water Samples[1]

Sample	Trimethylamine ng/mL (ppb)	Sodium Cation	Iodide Anion
WRT-ST9-0107-1-CETA-127-T-MFS	75	+	nd
WRT-ST9-0106-0-CETA-127-T-MFS	240	++++	X
WRT-ST9-0108-0-CETA-127-T-MFS	nd	++++	XX

1. Samples were approximately 125 mL each, received on December 15, 1994

nd = not detected.

+ denotes incidental non-quantified observation of sodium cation, number of symbols approximately proportional to response.

X denotes incidental non-quantified observation of iodide anion, number of symbols approximately proportional to response.

In addition to flow injection MS/MS analyses for TMA, positive and negative ion electrospray mass spectra were acquired for each water sample. These results are shown in Figures 6 through 8 which correspond to the background corrected mass spectra from flow injection. An aliquot of each sample was diluted with an equal volume of methanol to reduce surface tension and improve the stability of the electrospray process. Each figure contains the positive ion and negative ion mass spectra for one sample. The spectra contain evidence of coincident corona discharge APCI ionization in addition to electrospray ionization resulting in several mass peaks due to protonated water and methanol clusters and other unidentified species. Because these samples were described as having unexpected conductivity, we have highlighted the presence of sodium cation at m/z 23 in the positive ion

spectra and iodide cation at m/z 127 in the negative ion spectra for two of the three water samples.

Conclusions and Recommendations

The results obtained from the charcoal analyses represent a range of compounds and in some cases unusually high concentrations of polar compounds such as ethanol and acetone. The use of GC/MS to analyze a range of compounds is widely utilized for environmental analyses, however this approach becomes complicated for charcoal analyses because of the unusually high water loading. The older IML and USML charcoal samples did not show consistent water loading nor did these samples reveal the same concentration of non-polar compounds as determined under the previous contract. The remaining three sample sets showed a variety of polar and non-polar organic compounds.

Analysis of the water samples for TMA was accomplished using flow injection APCI tandem mass spectrometry. A detection limit of 75 ng/mL was obtained which allowed detection of TMA in two of the three samples provided by ION Electronics. In addition to TMA results, positive and negative ion electrospray mass spectra revealed qualitative evidence for low concentrations of sodium cation (m/z 23) and, unexpectedly, iodide anion (m/z 127) in two of the three samples. If absolute quantitative information for sodium and/or iodide is desired, we recommend atomic emission (Na) and ion chromatography (I) as the analysis methods of choice. These analyses can be conducted at Battelle using remaining quantities of these samples.

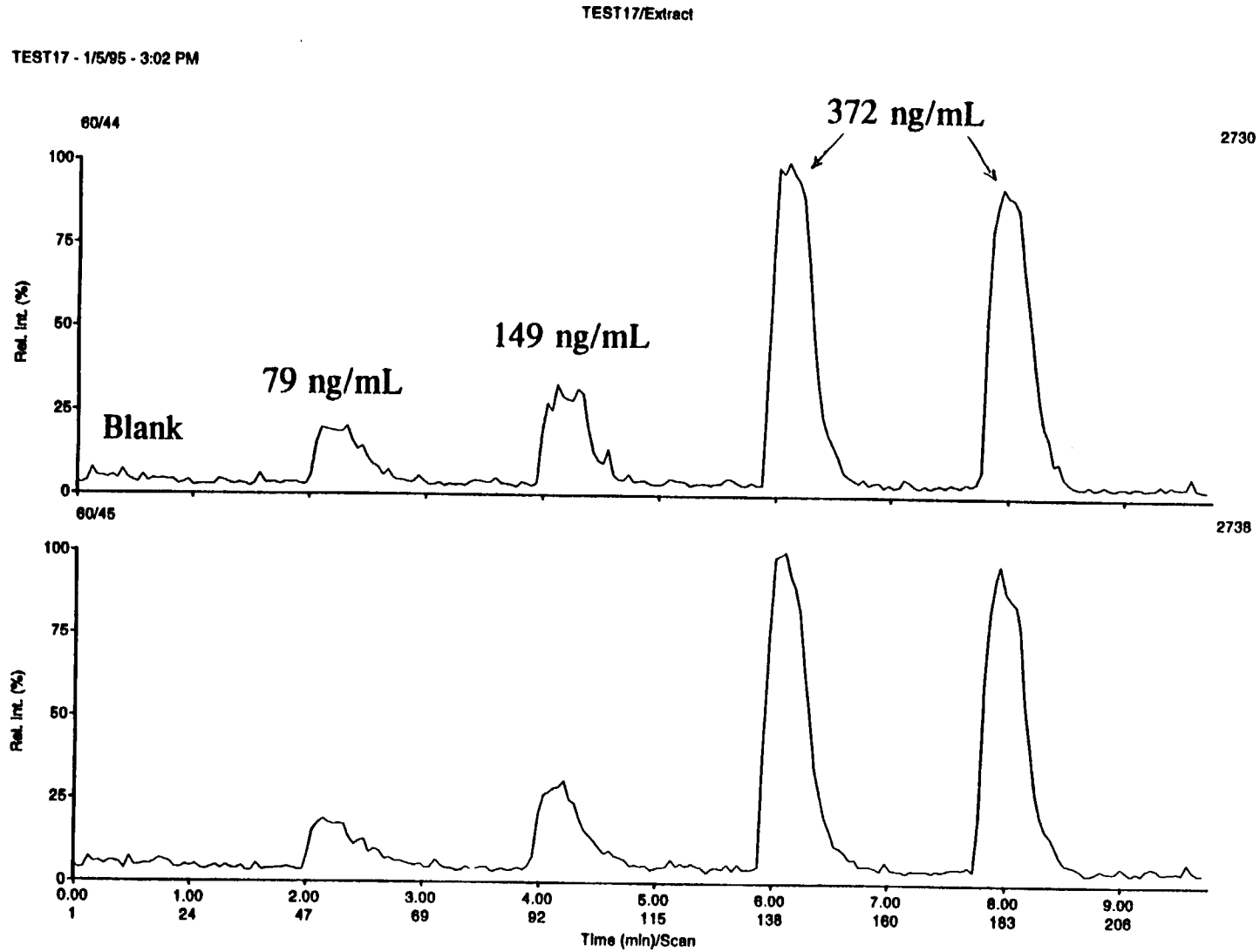


Figure 1. Flow injection response at the two daughter ions of trimethylamine as a function of aqueous standard concentration.

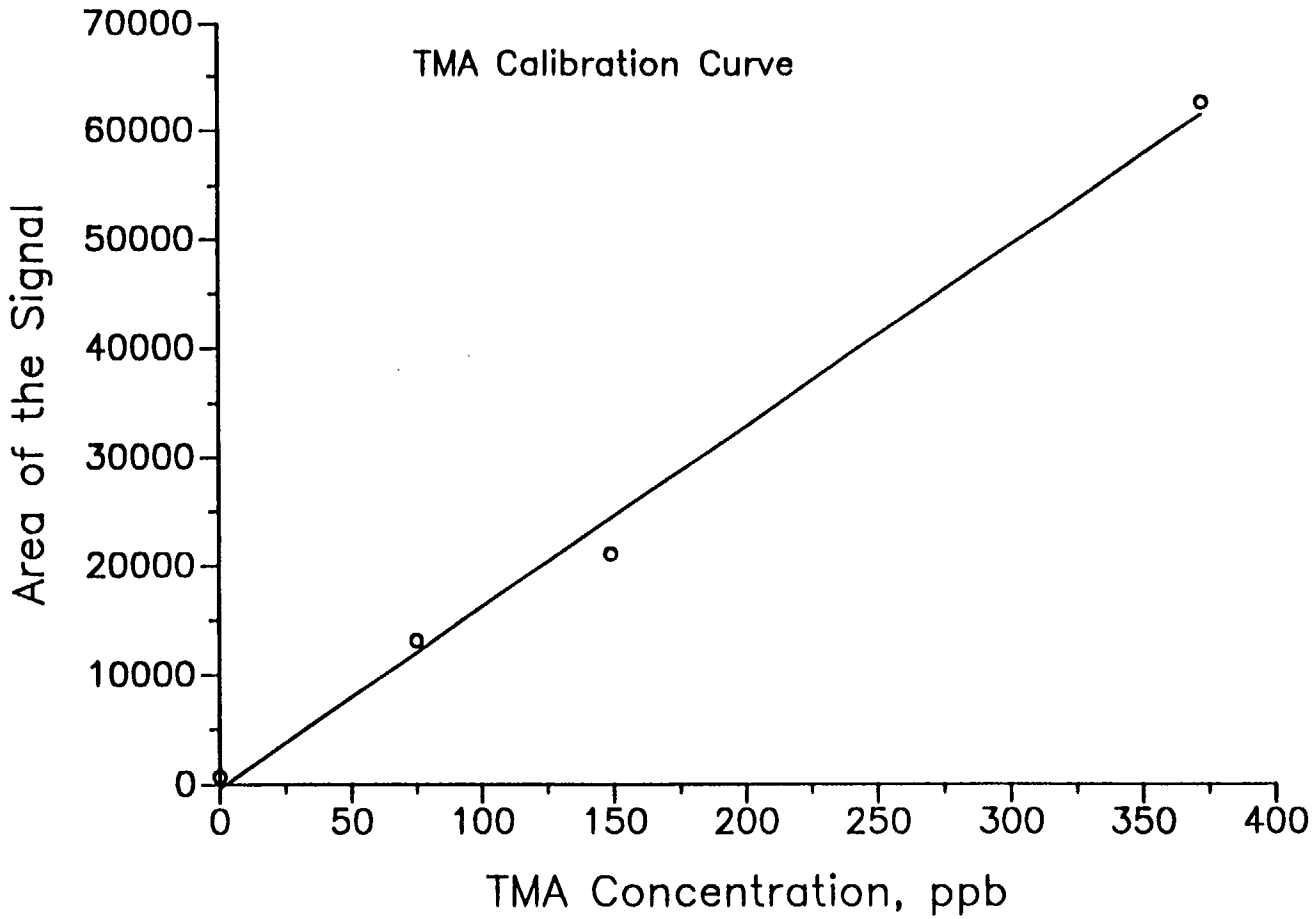


Figure 2. Calibration curve for Trimethylamine from m/z 60/44 response.

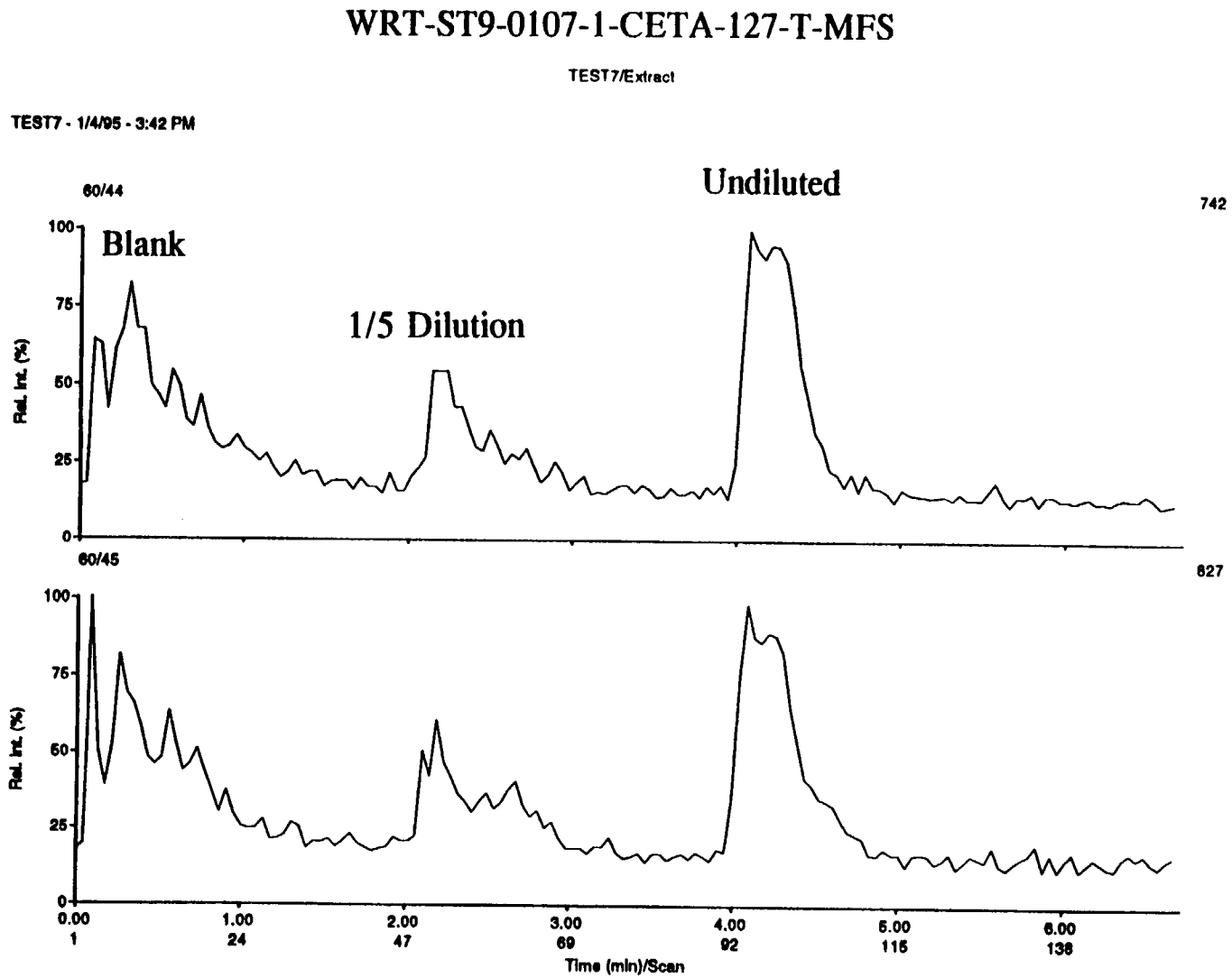


Figure 3. Trimethylamine for diluted and undiluted WRT-ST9-0107-1-CETA-127-T-MFS.

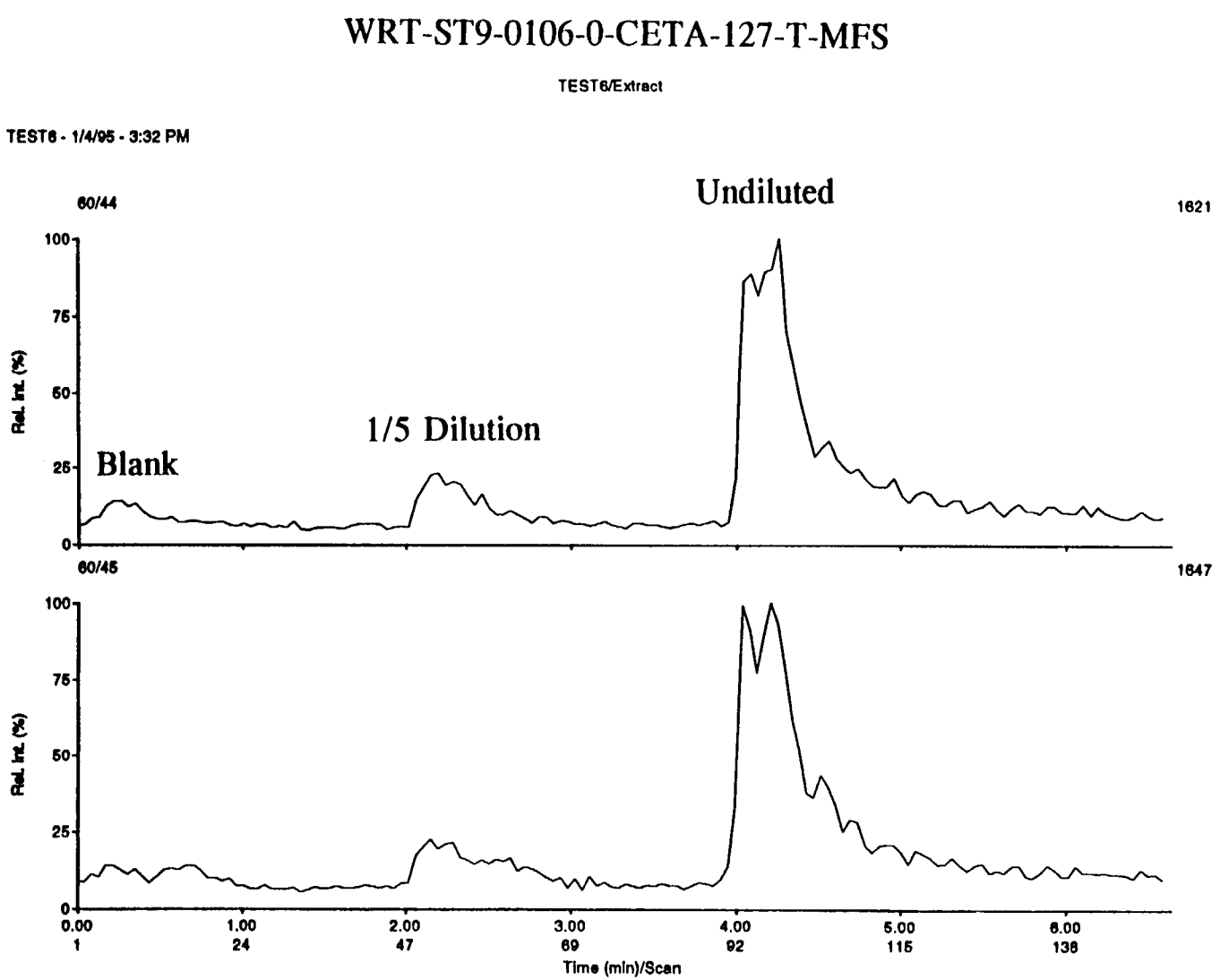


Figure 4. Trimethylamine response to diluted and undiluted WRT-ST9-0106-0-CETA-127-T-MFS.

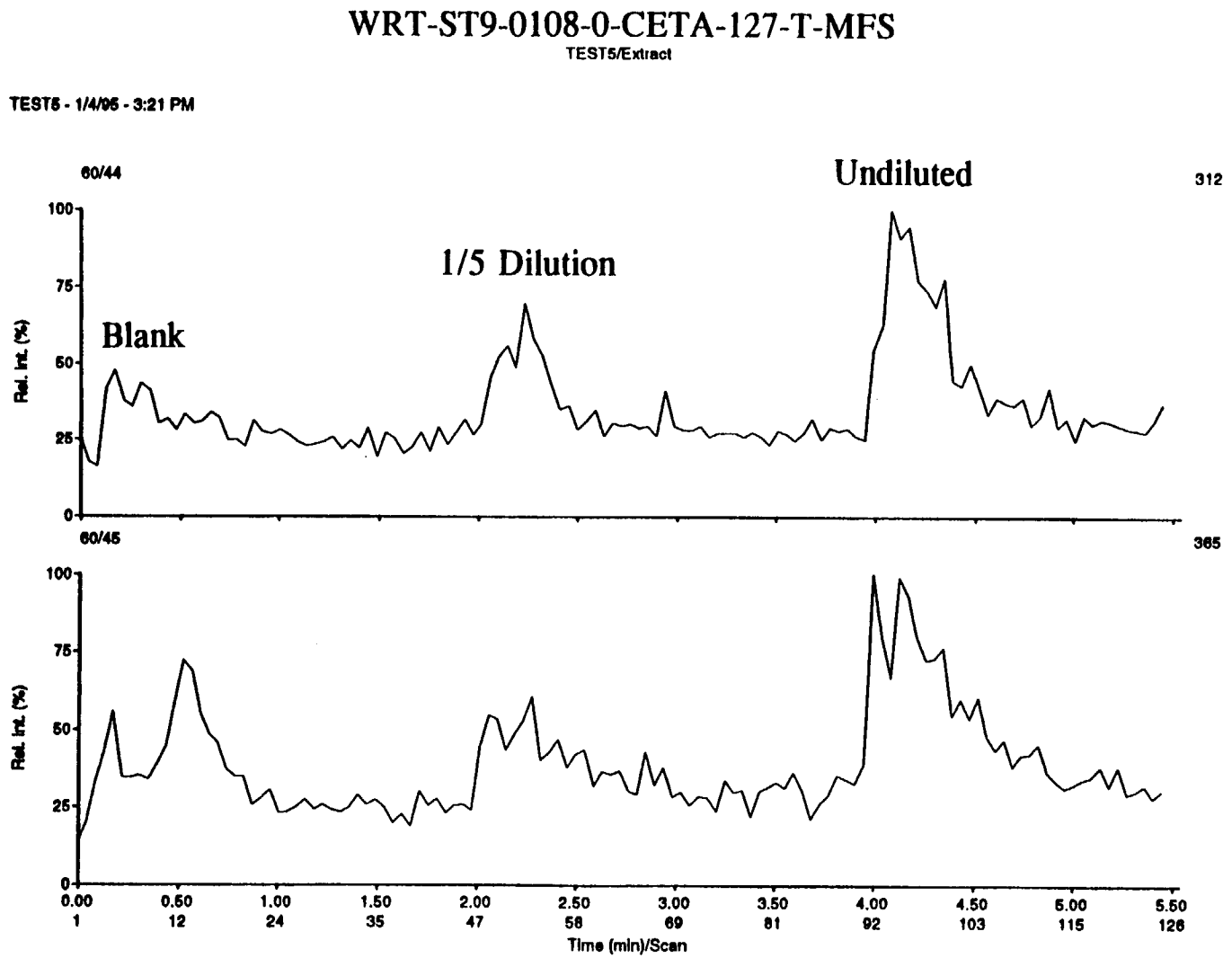
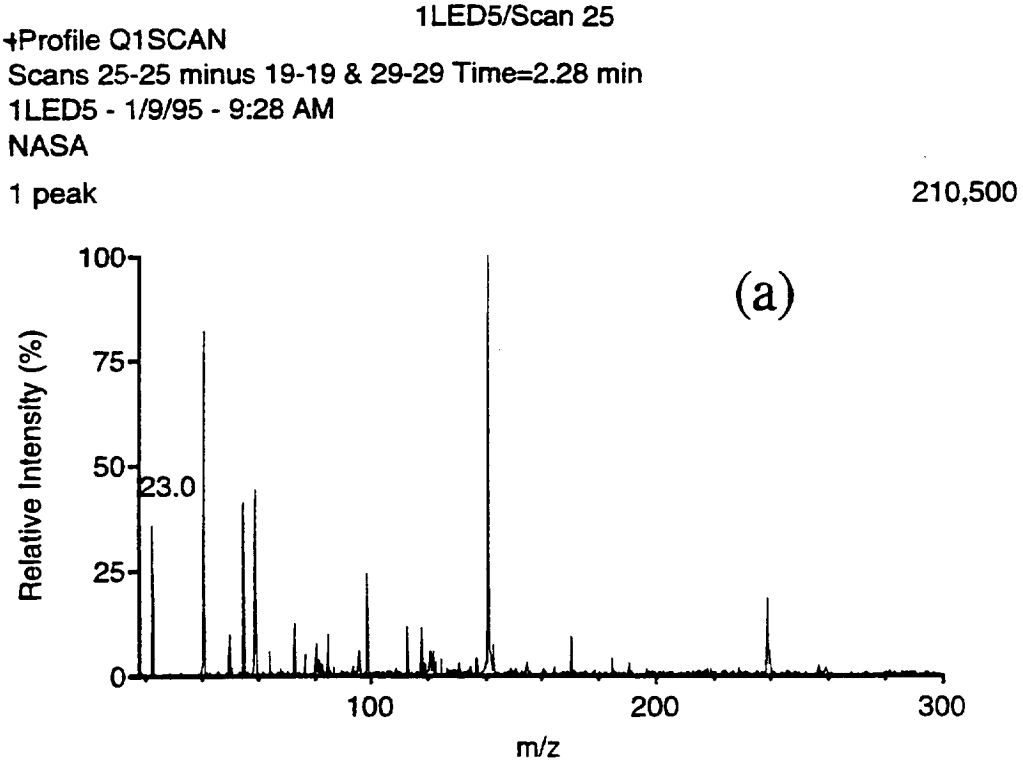


Figure 5. Trimethylamine ion response to diluted and undiluted WRT-ST9-0108-0-CETA-127-T-MFS.



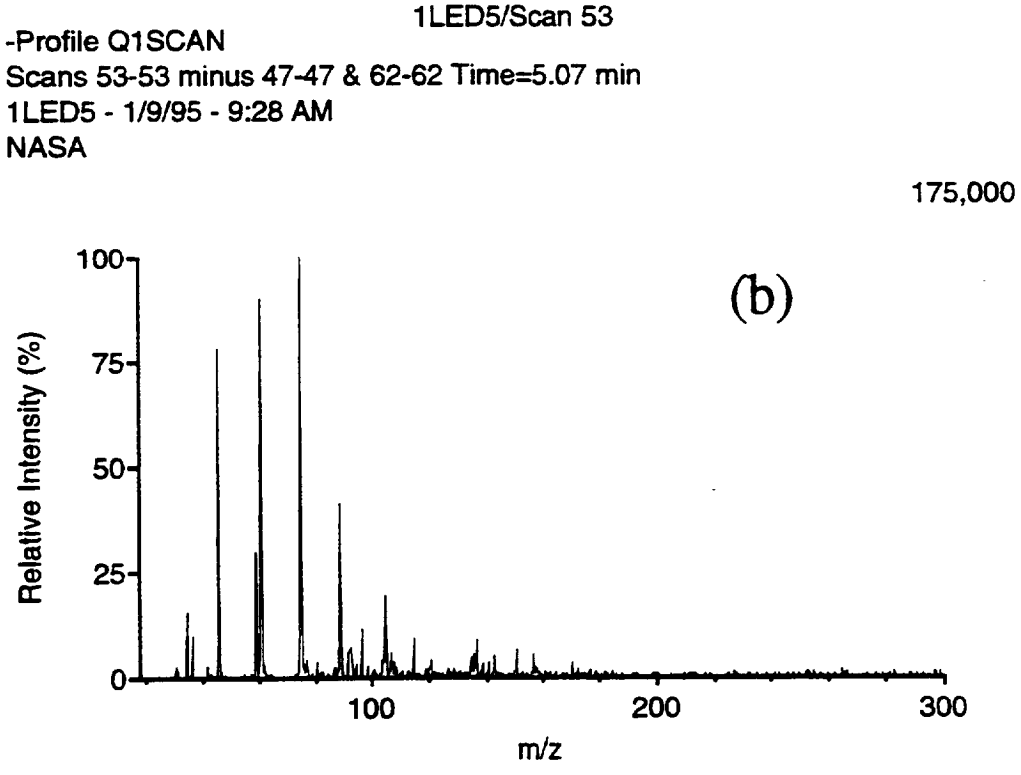
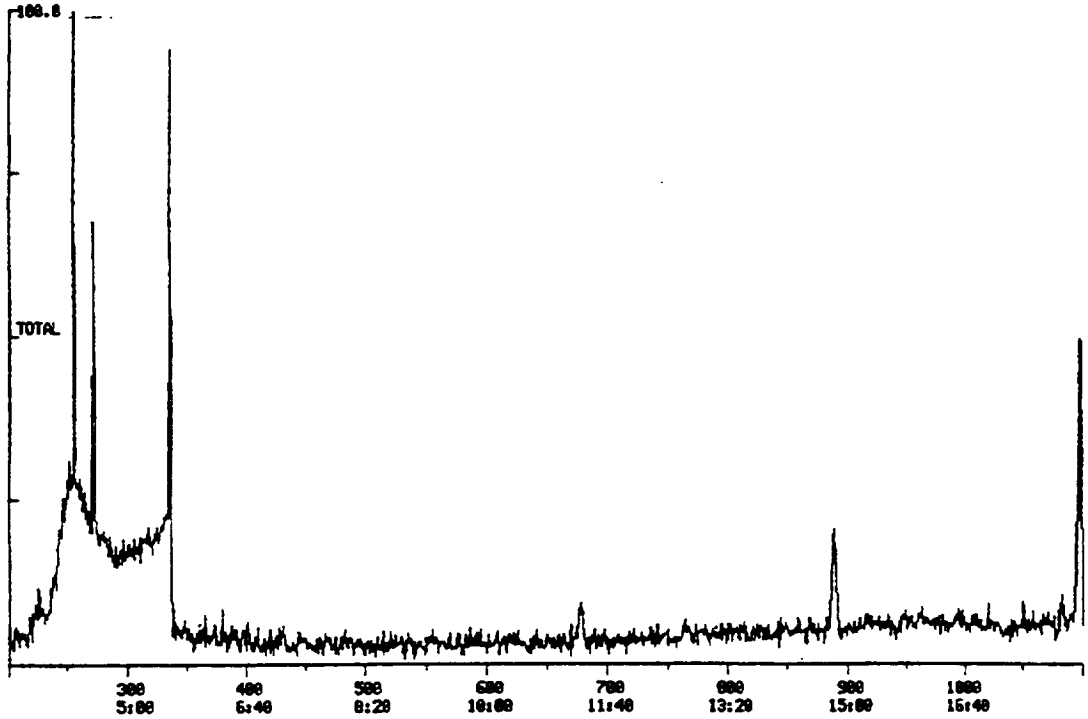


Figure 6. **Figure 6. Positive ion (a) and negative ion (b) electrospray mass spectra from WRT-ST9-0107-1-CETA-127-T-MFS.**

Appendix A

Results from Charcoal Analyses

TOTAL DATA: 199483 @1 SCANS 200 TO 1100
11/17/94 11:12:00 CALI: 199401CAL @9 OUT OF 200 TO 2000
SAMPLE: BMI CHARCOAL BLANK SPLITLESS 2 MIN @ 350 2200V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3



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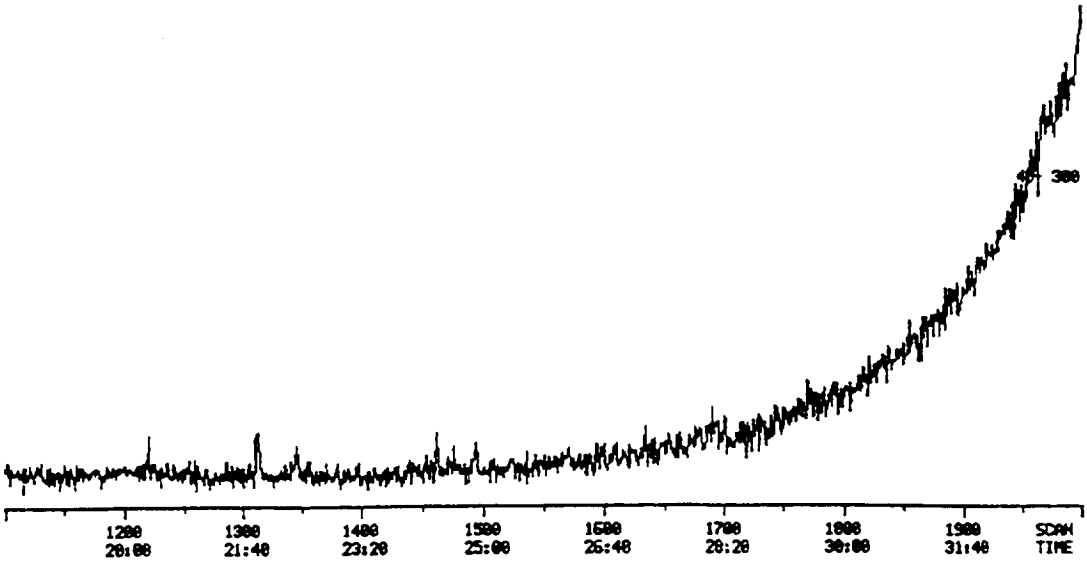
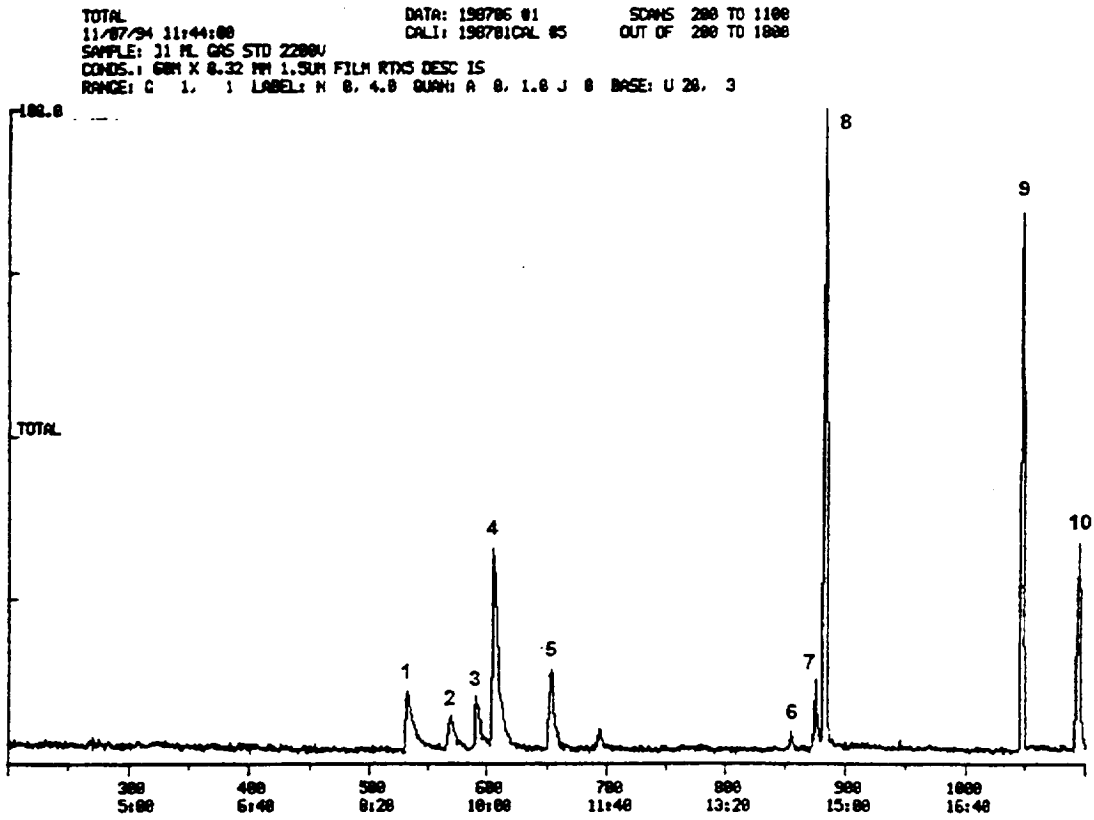
SAMPLE: BMI CHARCOAL BLANK SPLITLESS 2 MIN @ 350 2200V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3

100.0 9128.



	Gas Standard 198706 (1 mL injected)		
Peak No.	Identification	RIC Value	Known Conc (µg/mL)
1	Ethanol	35178	0.030
2	Trichlorofluoromethane	4160	0.010
3	Acetone	28438	0.030
4	IPA	4674	0.030
5	1,1,2-Trichloro-1,2,2-trifluoroethane	8992	0.010
6	1,1,1-Trichloroethane	2256	0.010
7	Butanol	22976	0.010
8	Benzene/Cyclohexane	64256	0.020
9	Toluene	55360	0.010
10	Dibromochloromethane	19488	0.010
11	2-Ethoxyethylacetate	21920	0.010
12	O-Xylene	46592	0.010


TOTAL
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11/07/94 11:44:00
CALI: 198701CAL 05
OUT OF 200 TO 1000
SAMPLE: 31 ML GAS STD 2200V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
TOTAL
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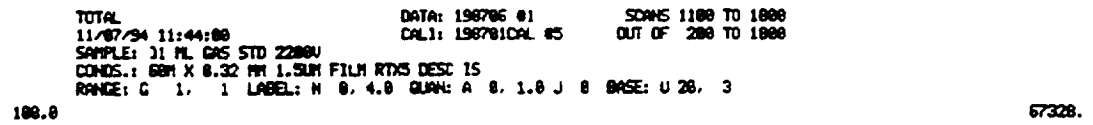
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DATA: 198706 01
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11/07/94 11:44:00
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OUT OF 200 TO 1000
SAMPLE: 31 ML GAS STD 2200V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
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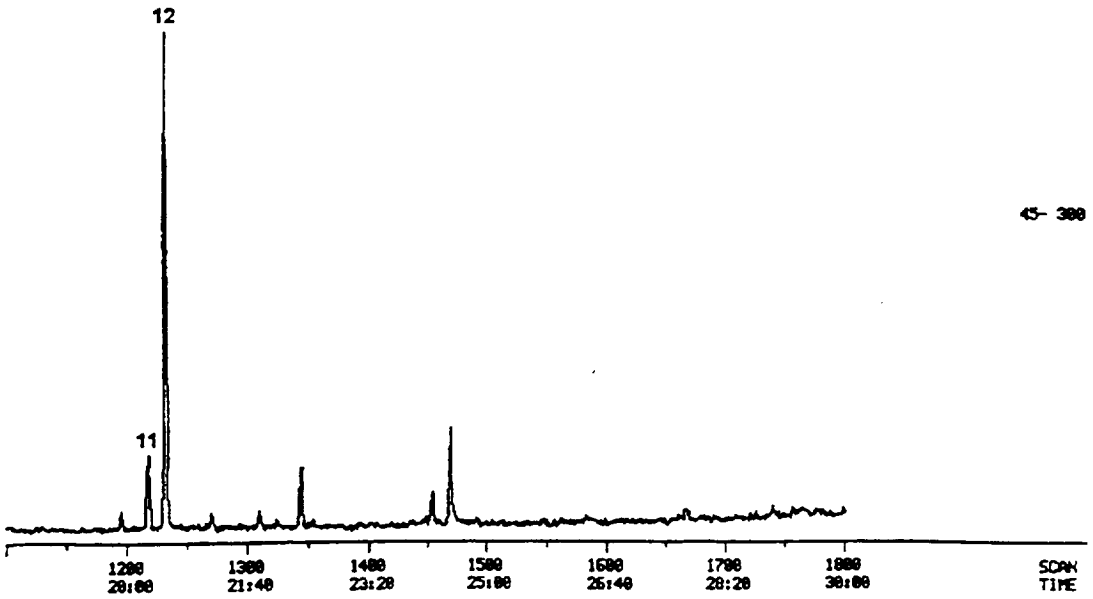
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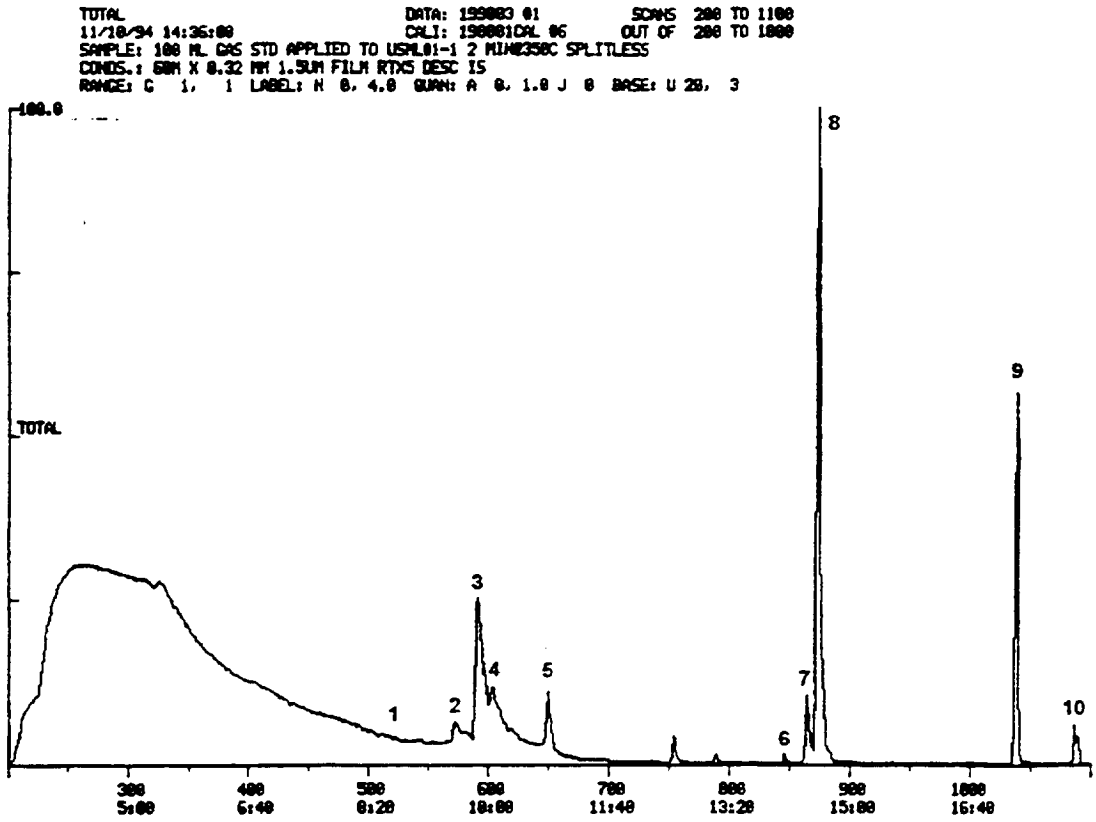
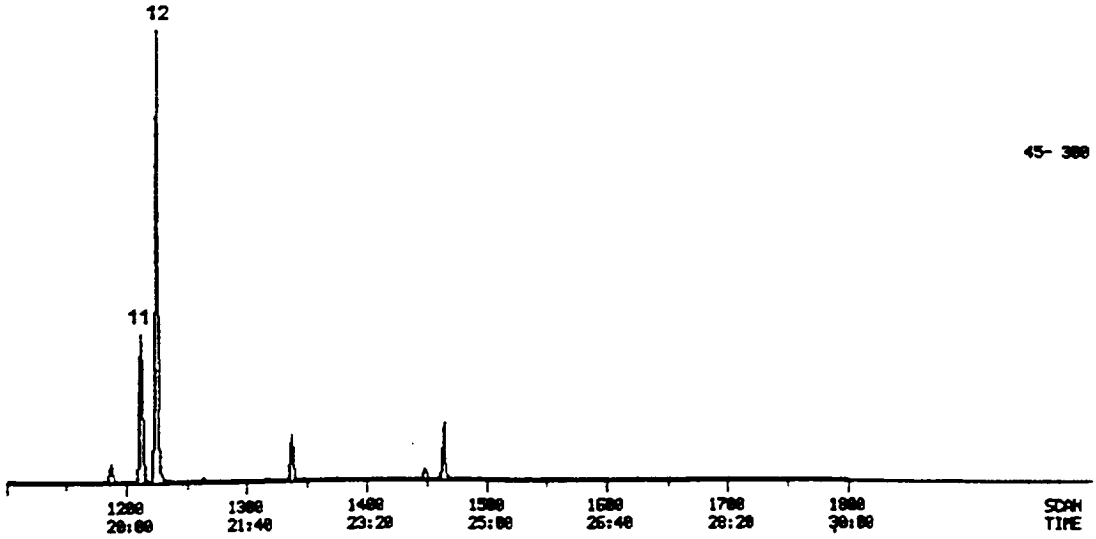
SCAN
TIME

	Platinum Charcoal 199003 100mL Standard			
Peak No.	Identification	RIC Value	µg in 100 mL	Measured Amount (µg)
1	Ethanol	18880	3.000	0.073
2	Trichlorofluoromethane	48832	1.000	0.146
3	Acetone	441344	3.000	1.051
4	IPA	85248	3.000	0.175
5	1,1,2-Trichloro-1,2,2-trifluoroethane	185088	1.000	0.261
6	1,1,1-Trichloroethane	31040	1.000	0.276
7	Butanol	295424	1.000	0.738
8	Benzene/Cyclohexane	2191350	2.000	0.525
9	Toluene	775168	1.000	0.331
10	Dibromochloromethane	118400	1.000	0.152
11	2-Ethoxyethylacetate	488448	1.000	0.558
12	O-Xylene	1017850	1.000	0.452



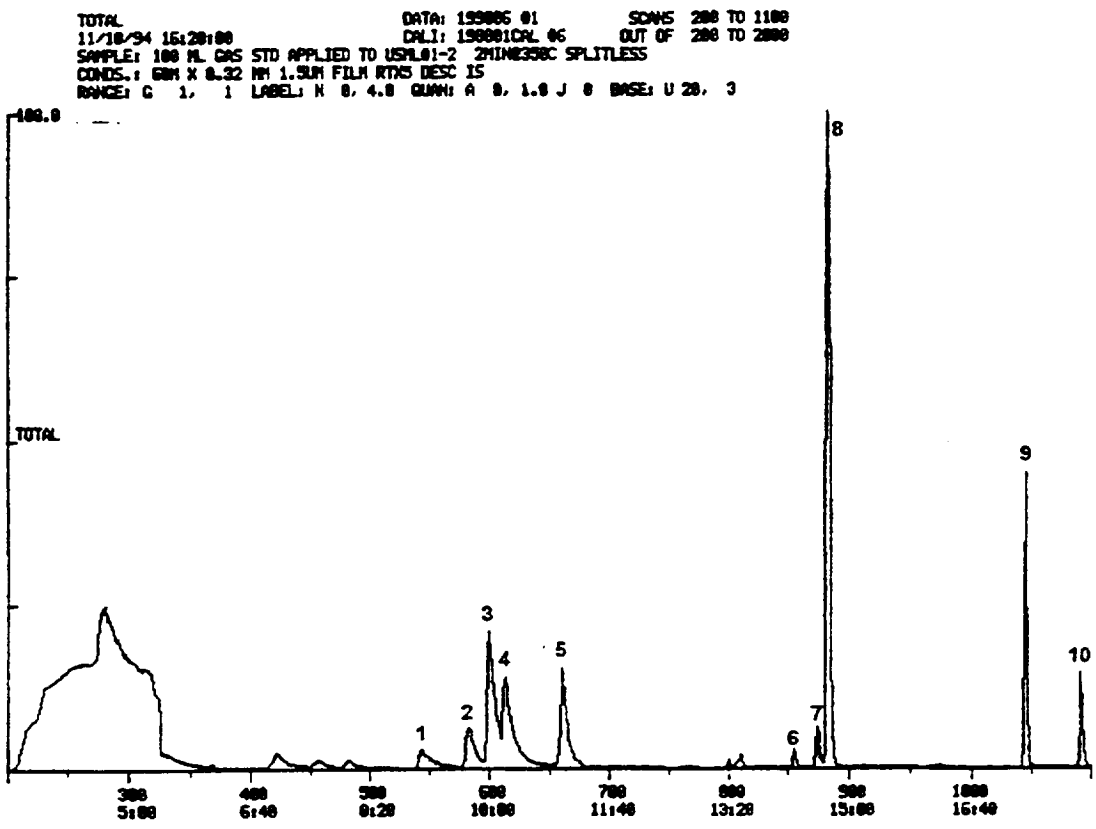
TOTAL DATA: 199003 01 SCANS 1100 TO 1000
11/10/94 14:36:00 CALI: 190001CAL 06 OUT OF 200 TO 1000
SAMPLE: 100 ML GAS STD APPLIED TO USML01-1 2 MIN@350C SPLITLESS
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0

2342910.



45- 300

	Acid Washed Charcoal 199006 100mL Standard			
Peak No.	Identification	RIC Value	µg in 100 mL	Measured Amount (µg)
1	Ethanol	147968	3.000	0.570
2	Trichlorofluoromethane	145408	1.000	0.436
3	Acetone	476160	3.000	1.134
4	IPA	266240	3.000	0.547
5	1,1,2-Trichloro-1,2,2-trifluoroethane	379904	1.000	0.537
6	1,1,1-Trichloroethane	58304	1.000	0.519
7	Butanol	112512	1.000	0.281
8	Benzene/Cyclohexane	2260990	2.000	0.542
9	Toluene	1116150	1.000	0.477
10	Dibromochloromethane	238848	1.000	0.307
11	2-Ethoxyethylacetate	587776	1.000	0.672
12	O-Xylene	807936	1.000	0.359

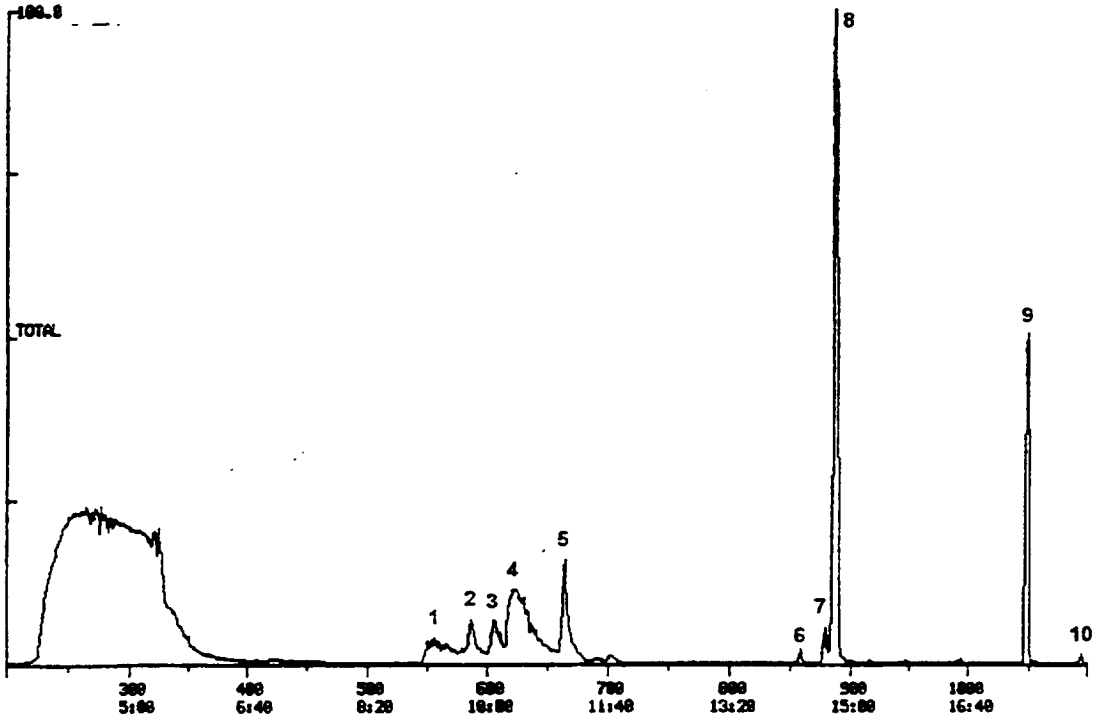


TOTAL
DATA: 199006 01 SCANS 1100 TO 2000
11/10/94 16:20:00 CALI: 190001CAL 06 OUT OF 200 TO 2000
SAMPLE: 100 ML GAS STD APPLIED TO USML01-2 2MINE350C SPLITLESS
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC 15
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
2631078.

45- 300

	Untreated Charcoal 198906 100mL Standard			
Peak No.	Identification	RIC Value	µg in 100 mL	Measured Amount (µg)
1	Ethanol	81552	3.000	0.098
2	Trichlorofluoromethane	86400	1.000	0.168
3	Acetone	262656	3.000	0.371
4	IPA	134400	3.000	0.141
5	1,1,2-Trichloro-1,2,2-trifluoroethane	230400	1.000	0.212
6	1,1,1-Trichloroethane	26240	1.000	0.158
7	Butanol	323584	1.000	0.334
8	Benzene/Cyclohexane	2035710	2.000	0.253
9	Toluene	1019900	1.000	0.315
10	Dibromochloromethane	24544	1.000	0.025
11	2-Ethoxyethylacetate	141568	1.000	0.066
12	O-Xylene	832512	1.000	0.276

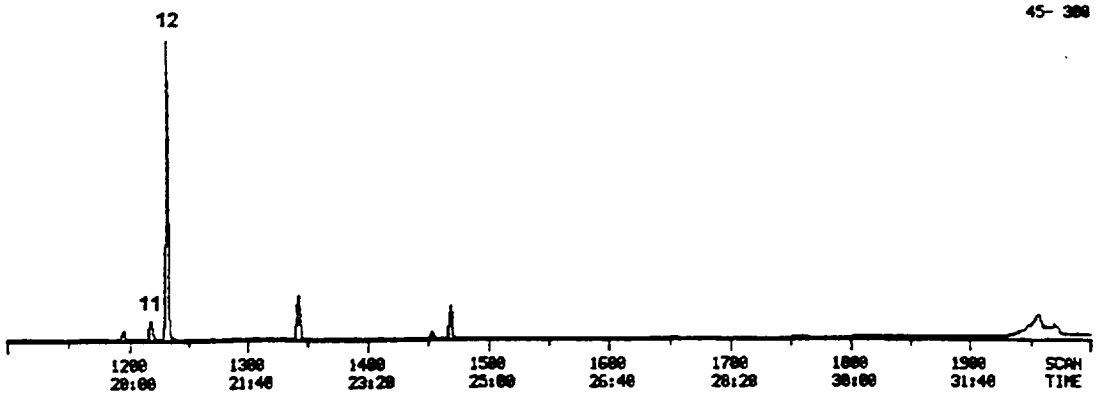
TOTAL DATA: 198986 01 SCANS 200 TO 1100
11/09/94 18:05:00 CALI: 198981CAL 015 OUT OF 200 TO 2000
SAMPLE: 100 ML GAS STD APPLIED TO CHARCOAL 2 MINS 350C SPLITLESS
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3



TOTAL DATA: 198986 01 SCANS 1100 TO 2000
11/09/94 18:05:00 CALI: 198981CAL 015 OUT OF 200 TO 2000
SAMPLE: 100 ML GAS STD APPLIED TO CHARCOAL 2 MINS 350C SPLITLESS
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3

100.0

1004158.



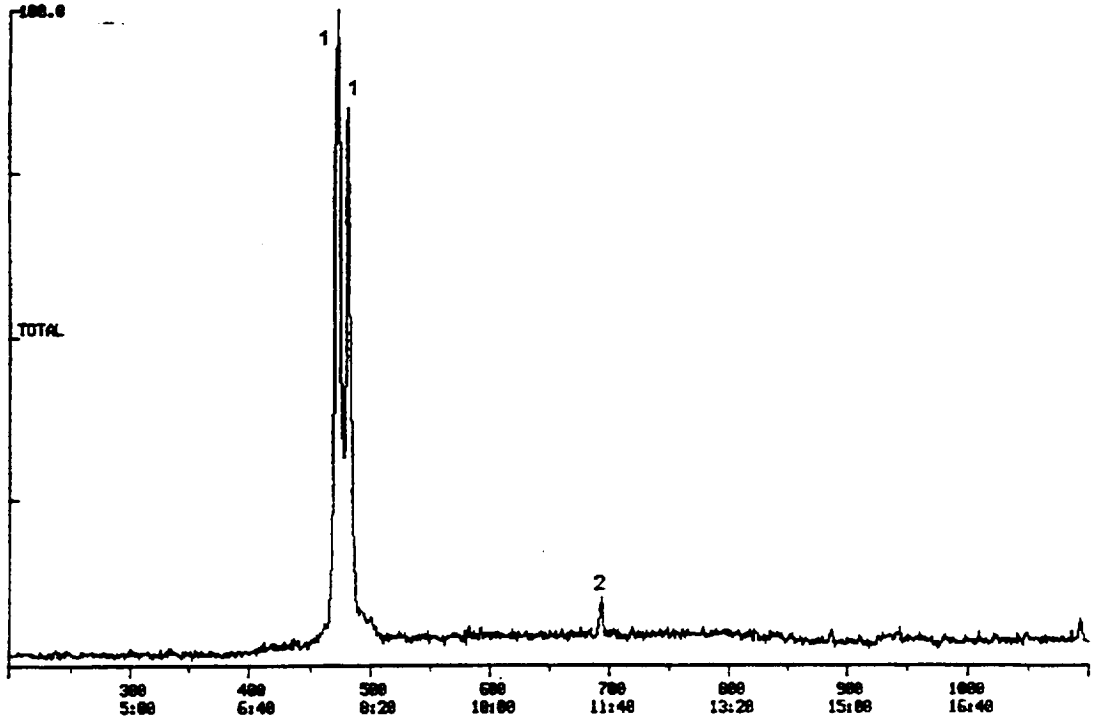
	IML-1 #1 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	35840	0.621		b
2	Methylene chloride	3672	0.064		b

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds

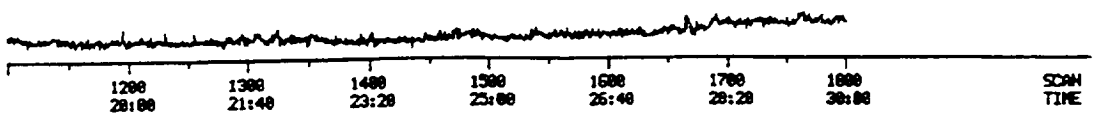
TOTAL DATA: 198304 01 SCANS 200 TO 1100
11/03/94 14:14:00 CALI: 198301CAL 05 OUT OF 200 TO 1000
SAMPLE: IAL-101 SPLITLESS 2MIN@ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



TOTAL DATA: 198304 01 SCANS 1100 TO 1800
11/03/94 14:14:00 CALI: 198301CAL 05 OUT OF 200 TO 1000
SAMPLE: IAL-101 SPLITLESS 2MIN@ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

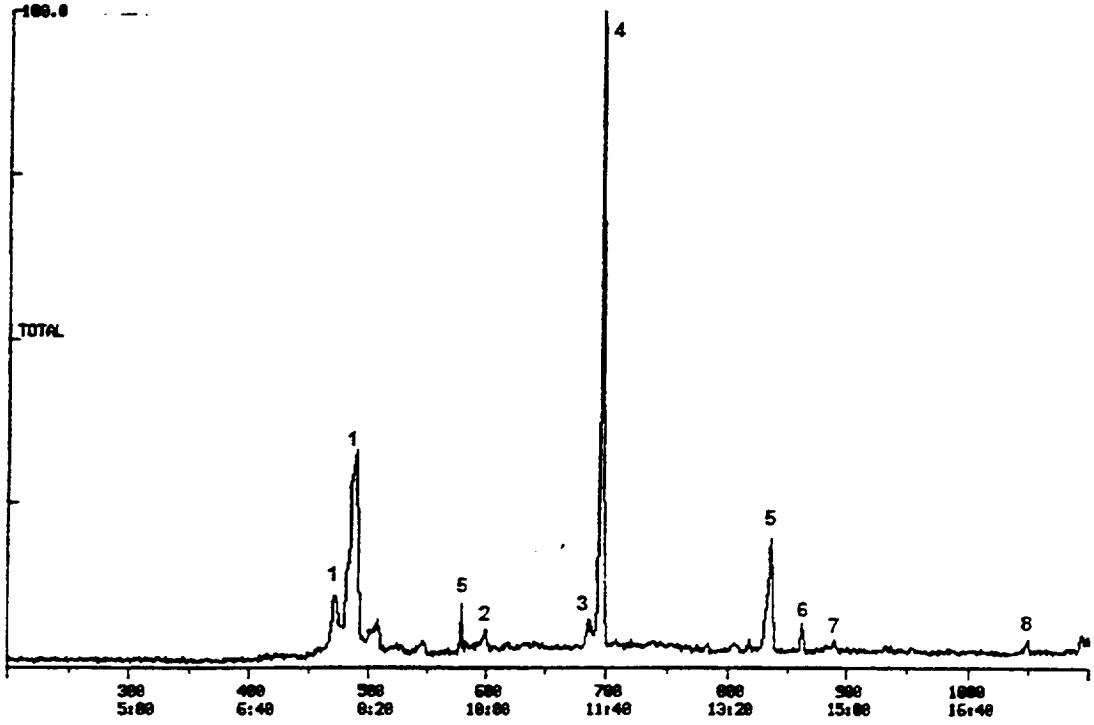
100.0 51200.

45- 300



	IML-1 #2 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	22720	0.530		b
2	Dichlorodifluoromethane	3600	0.084		b
3	1,1,2-Trichloro-1,2,2-trifluoroethane	5064	0.076	0.141	a
4	Methylene chloride	95616	2.231		b
5	Acetic acid	85408	0.279		c
6	1,1,1-Trichloroethane	4472	0.173	0.334	a
7	Benzene + Cyclohexane	2014	0.006	0.011	a
8	Toluene	2680	0.006	0.012	a
9	Caprolactam	12960	0.042		c
a Quantitation based on an actual standard compound.					
b Quantitation based on comparison to average of three halogenated standard compounds.					
c Quantitation based on comparison to average of four non-halogenated standard compounds.					

TOTAL DATA: 198503 01 SCANS 200 TO 1100
11/03/94 13:33:00 CALI: 198301CAL 05 OUT OF 200 TO 1000
SAMPLE: IML-102 SPLITLESS 2MINN 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



TOTAL DATA: 198503 01 SCANS 1100 TO 1000
11/03/94 13:33:00 CALI: 198301CAL 05 OUT OF 200 TO 1000
SAMPLE: IML-102 SPLITLESS 2MINN 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

100.0

88704.

45- 300

	IML-1 #3 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	14640	0.351		b
2	Methylene chloride	70784	1.697		b
3	BP 45, 61(50)	200192	1.01		c
4	BP 31, 45(85), 61(50)	815104	4.13		c
5	Xylene or Ethylbenzene	2616	0.013		c
6	Phenol	3028	0.015		c
7	Limonene	3508	0.018		c
8	Benzoic acid, methyl ester	4256	0.022		c
9	Methenamine	208128	1.053		c
10	Caprolactam	8992	0.046		c

a Quantitation based on an actual standard compound.

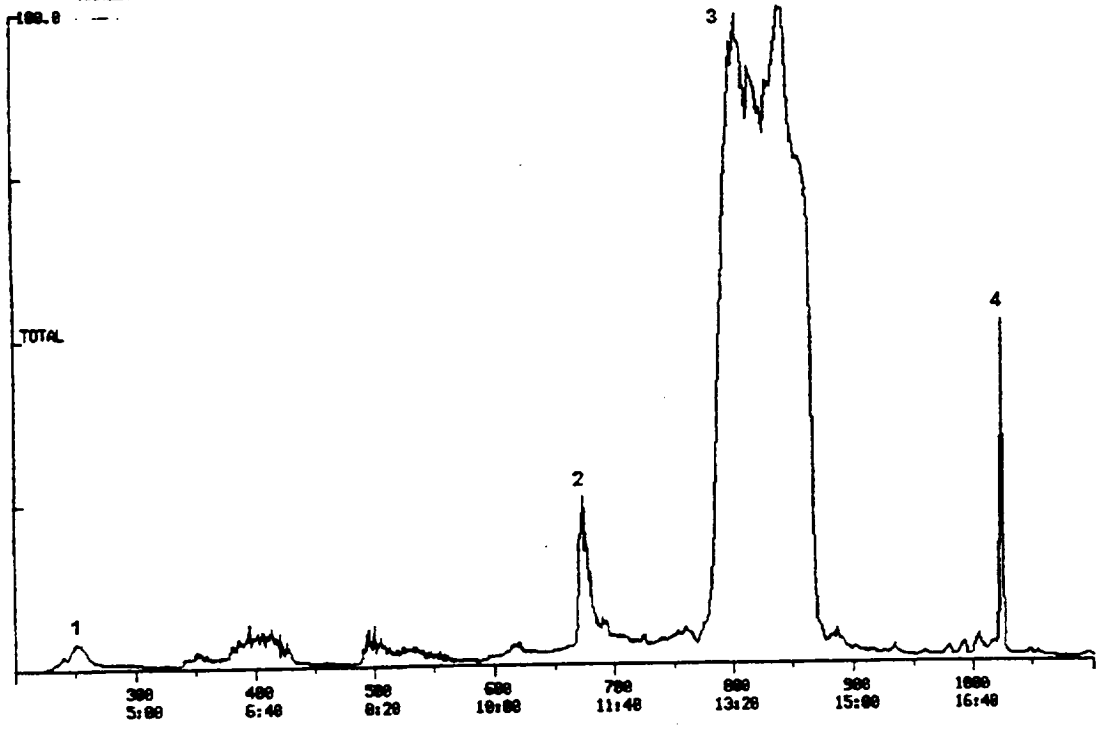
b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.

TOTAL
10/24/94 15:08:00
SAMPLE: IML-103 SPLITLESS 2 MIN @ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: H 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: 190410 01
CALI: 190301CAL 05

SCANS 200 TO 1100
OUT OF 200 TO 2000



TOTAL
10/24/94 15:08:00
SAMPLE: IML-103 SPLITLESS 2 MIN @ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: H 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: 190410 01
CALI: 190301CAL 05

SCANS 1100 TO 2000
OUT OF 200 TO 2000

100.0

37836B.

45- 300

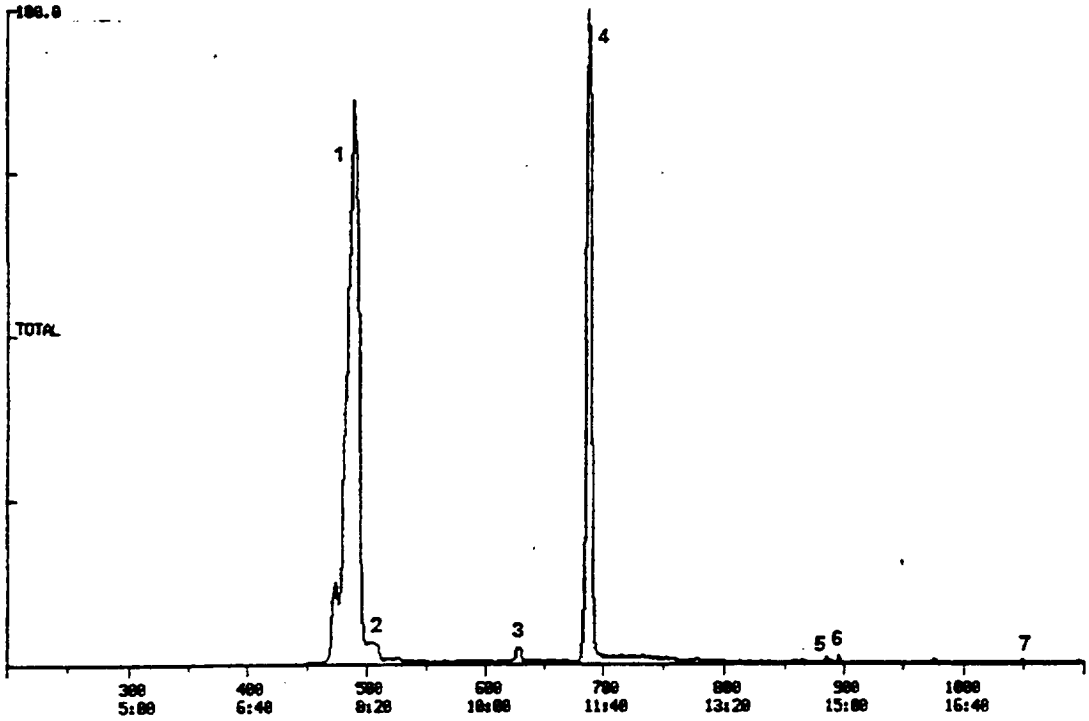
	IML-1 #4 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	274432	6.437		b
2	Dichlorodifluoromethane	8544	0.200		b
3	2-Propenal	15456	0.077		c
4	Methylene chloride	517120	12.129		b
5	Benzene + Cyclohexane	3996	0.017	0.068	a
6	Acetic acid	18080	0.090		c
7	Toluene	3148	0.011	0.035	a
8	Xylene or Ethylbenzene	1846	0.009		c
9	2-Butoxyethanol	2872	0.014		c
10	Trimethylbenzene	1638	0.008		c
11	Limonene	6944	0.034		c
12	Methenamine	17152	0.085		c
13	Hydrocarbon	4280	0.021		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.

TOTAL DATA: 190409 01 SCANS 200 TO 1100
10/24/94 14:21:00 CAL1: 190301CAL 05 OUT OF 200 TO 2000
SAMPLE: IML-104 SPLITLESS 2 MIN DESORB@ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



TOTAL DATA: 190409 01 SCANS 1100 TO 2000
10/24/94 14:21:00 CAL1: 190301CAL 05 OUT OF 200 TO 2000
SAMPLE: IML-104 SPLITLESS 2 MIN DESORB@ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

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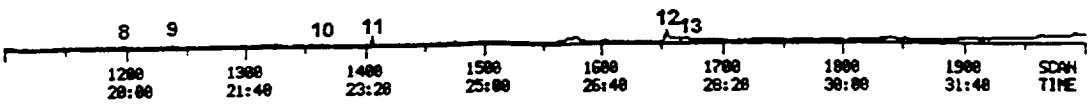
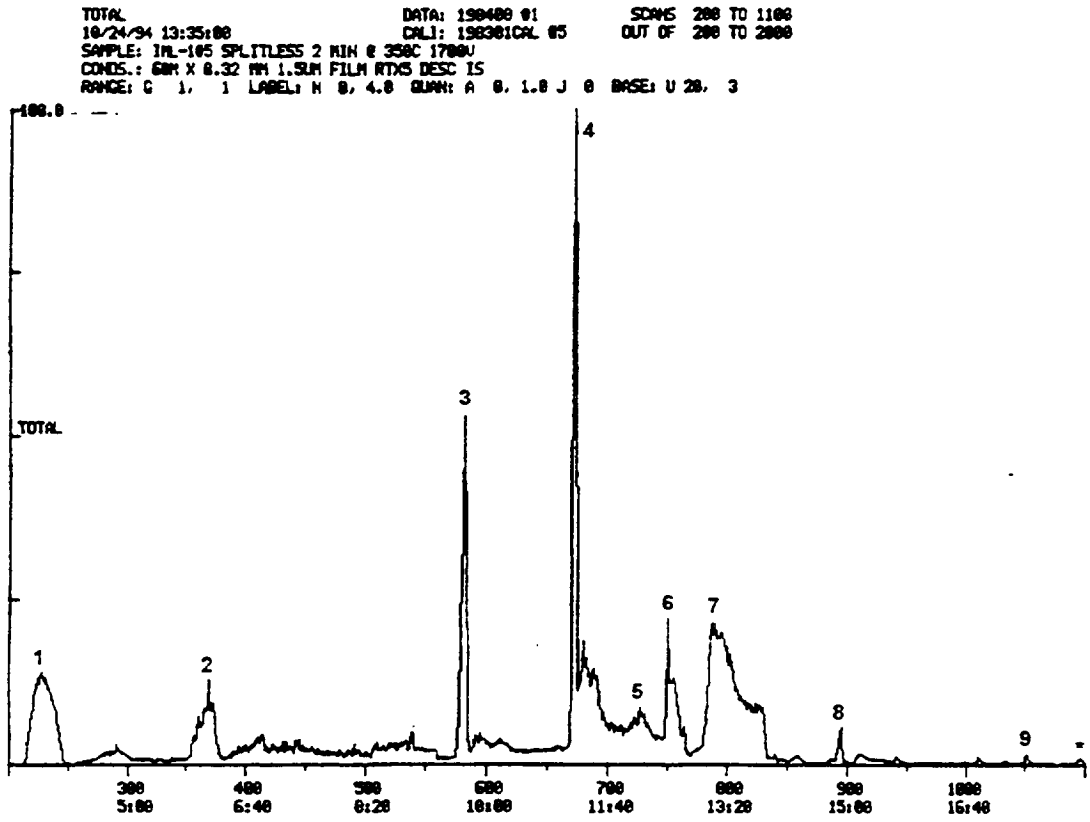
45- 300



	IML-1 #5 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	125440	2.115		b
2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	43776	0.738		b
3	Trichlorofluoromethane	226816	4.308	25.614	a
4	Methylene chloride	512000	8.632		b
5	Isopropyl alcohol	246784	19.245	410.332	a
6	BP 31, 60(50)	301568	1.073		c
7	BP 31, 61(60)	91264	0.325		c
8	Benzene	28960	0.089	0.352	a
9	Toluene	9776	0.025	0.078	a
10	Xylene or Ethylbenzene	6072	0.022		c
11	Phenol	2688	0.010		c
12	Benzoic acid, methyl ester	7912	0.028		c
13	Methenamine	330240	1.175		c
14	Caprolactam	4536	0.016		c
a Quantitation based on an actual standard compound.					
b Quantitation based on comparison to average of three halogenated standard compounds.					
c Quantitation based on comparison to average of four non-halogenated standard compounds.					


TOTAL DATA: 190408 01 SCANS 200 TO 1100
10/24/94 13:35:08 CAL1: 190301CAL 05 OUT OF 200 TO 2000
SAMPLE: IML-105 SPLITLESS 2 MIN @ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: H 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
TOTAL
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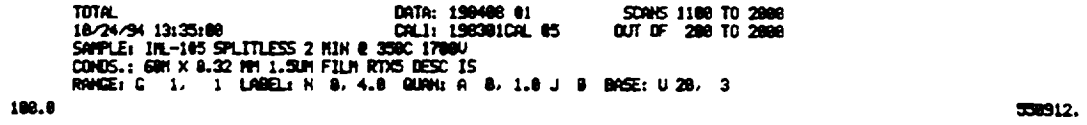
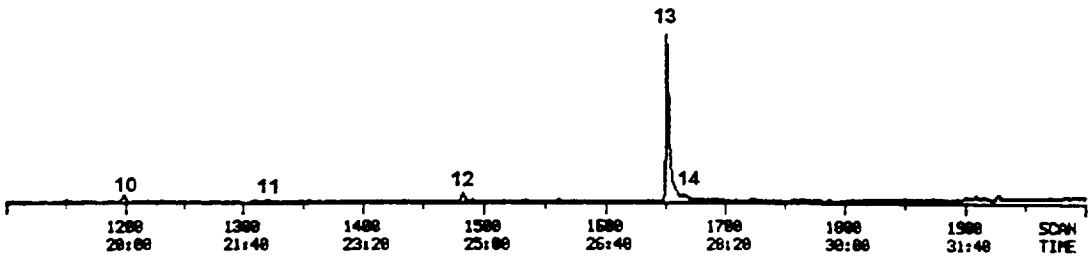

TOTAL DATA: 190408 01 SCANS 1100 TO 2000
10/24/94 13:35:08 CAL1: 190301CAL 05 OUT OF 200 TO 2000
SAMPLE: IML-105 SPLITLESS 2 MIN @ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: H 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
550912.

45- 300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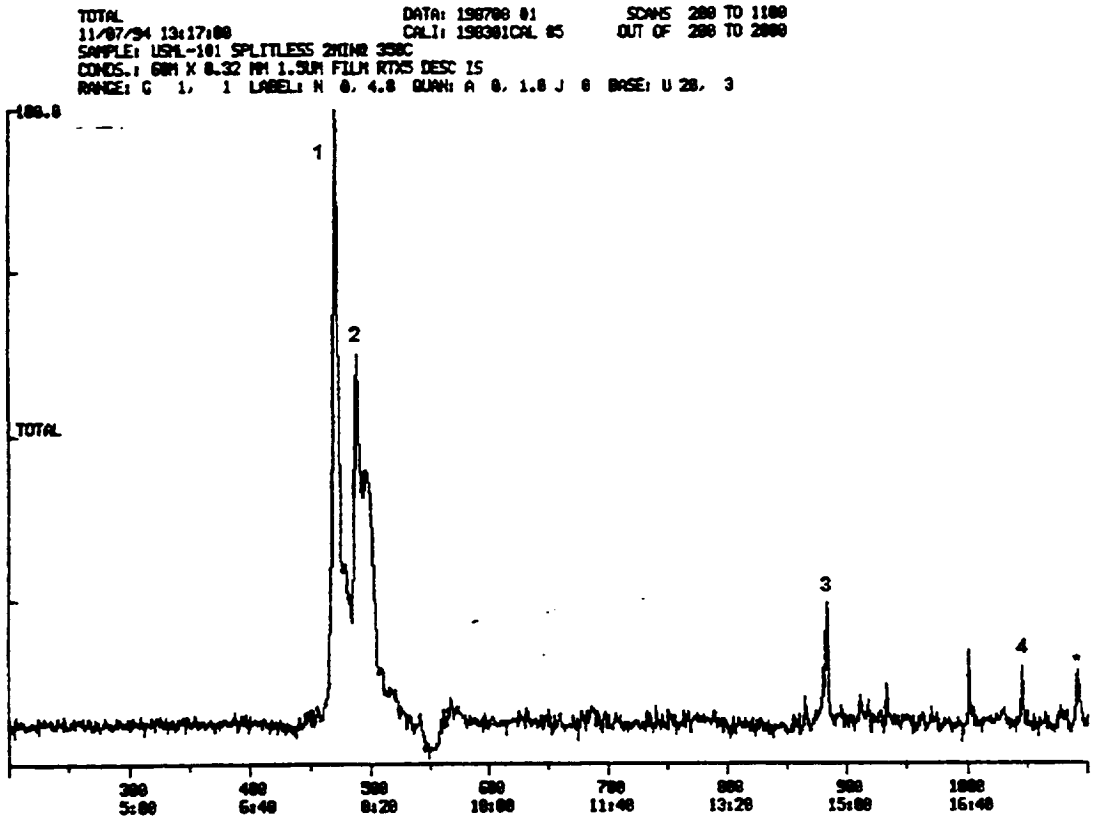
1400 23:20
1500 25:00
1600 26:40
1700 28:20
1800 30:00
1900 31:40
SCAN TIME

	USML-1 #1 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	31968	0.452		b
2	Dichlorodifluoromethane	6984	0.099		b
3	Benzene	3176	0.007	0.014	a
4	Toluene	1492	0.002	0.006	a
5	Xylene or Ethylbenzene	1144	0.002		c
6	Phenol + Benzaldehyde	1834	0.003		c
7	Hydrocarbon	1092	0.002		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.


TOTAL
DATA: 198708 01
SCANS 200 TO 1100
11/07/94 13:17:00
CALI: 198301CAL 05
OUT OF 200 TO 2000
SAMPLE: USHL-101 SPLITLESS 2MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
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TOTAL
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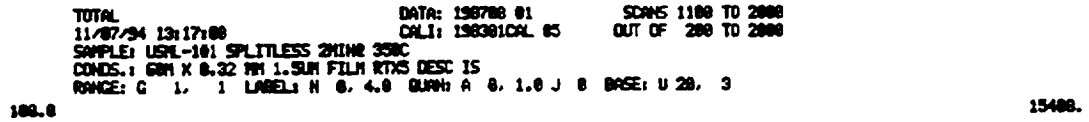
TOTAL
DATA: 198708 01
SCANS 1100 TO 2000
11/07/94 13:17:00
CALI: 198301CAL 05
OUT OF 200 TO 2000
SAMPLE: USHL-101 SPLITLESS 2MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
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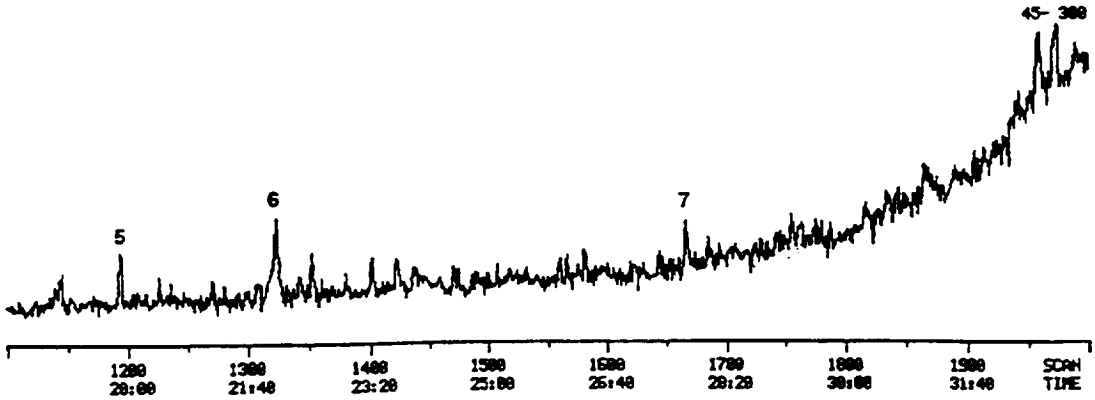
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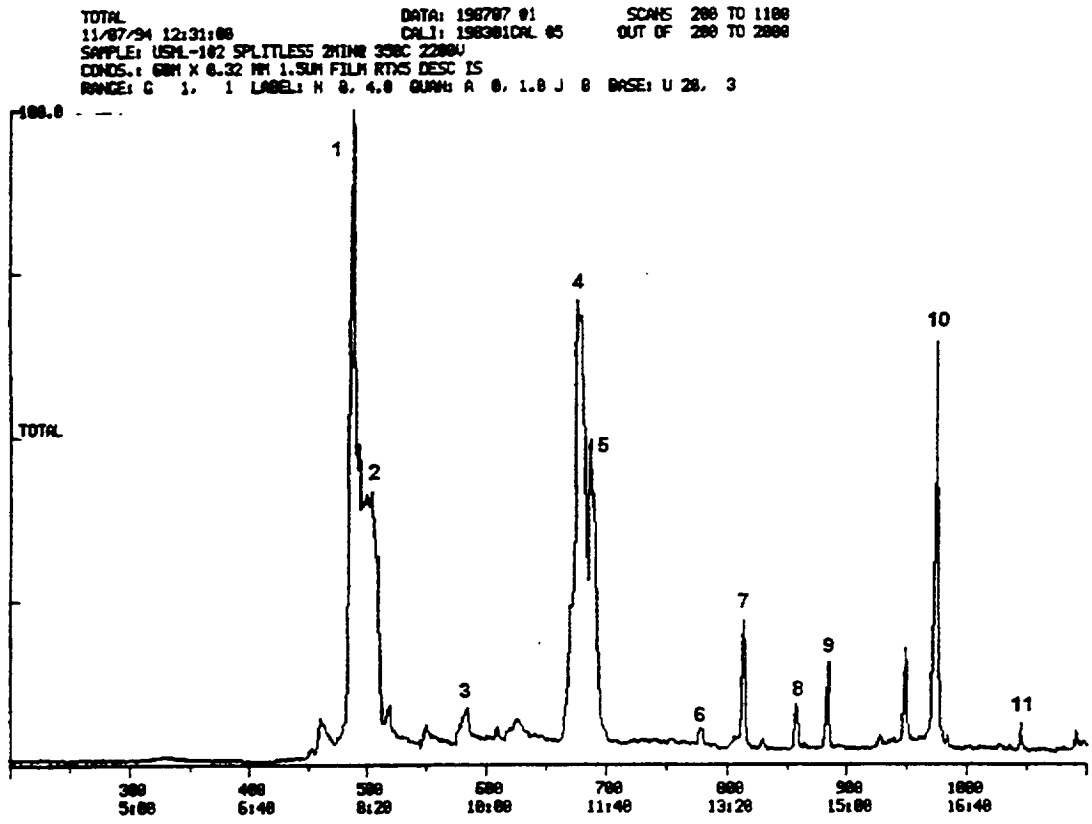
1900
31:40
SCAN
TIME

	USML-1 #2 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Sulfur dioxide	132352	0.150		c
2	Chloromethane	17760	0.153		b
3	Hydroxyacetaldehyde	244736	0.277		c
4	1,1,2-Trichloro-1,2,2-trifluoroethane	88192	0.433	0.808	a
5	Methylene chloride	74368	0.640		b
6	Hexane	13328	0.015		c
7	Trichloromethane	37568	0.323		b
8	1,1,1-Trichloroethane	23712	0.464	0.895	a
9	Benzene	22496	0.031	0.057	a
10	Acetic acid	382464	0.433		c
11	Toluene	7848	0.006	0.013	a
12	Xylene or Ethylbenzene	2476	0.003		c
13	2-Propenoic acid, butyl ester	14288	0.016		c
14	Styrene	13712	0.016		c
15	Benzaldehyde	14288	0.016		c
16	Hydrocarbon	5472	0.006		c
17	Trimethylbenzene	3380	0.004		c
18	Limonene	5496	0.006		c
19	Hydrocarbon	5520	0.006		c
20	2-Furanmethanol	7568	0.009		c
21	Hydrocarbon	4952	0.006		c
22	Naphthalene	3776	0.004		c
23	Hydrocarbon	21824	0.025		c
24	Hydrocarbon	10080	0.011		c
25	Hydrocarbon	5648	0.006		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.



TOTAL
DATA: 198707 01
SCANS 1100 TO 2000
11/07/94 12:31:00
CALI: 198301CAL 05
OUT OF 200 TO 2000
SAMPLE: USHL-102 SPLITLESS 2MINR 350C 2200V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3
100.0

170496.

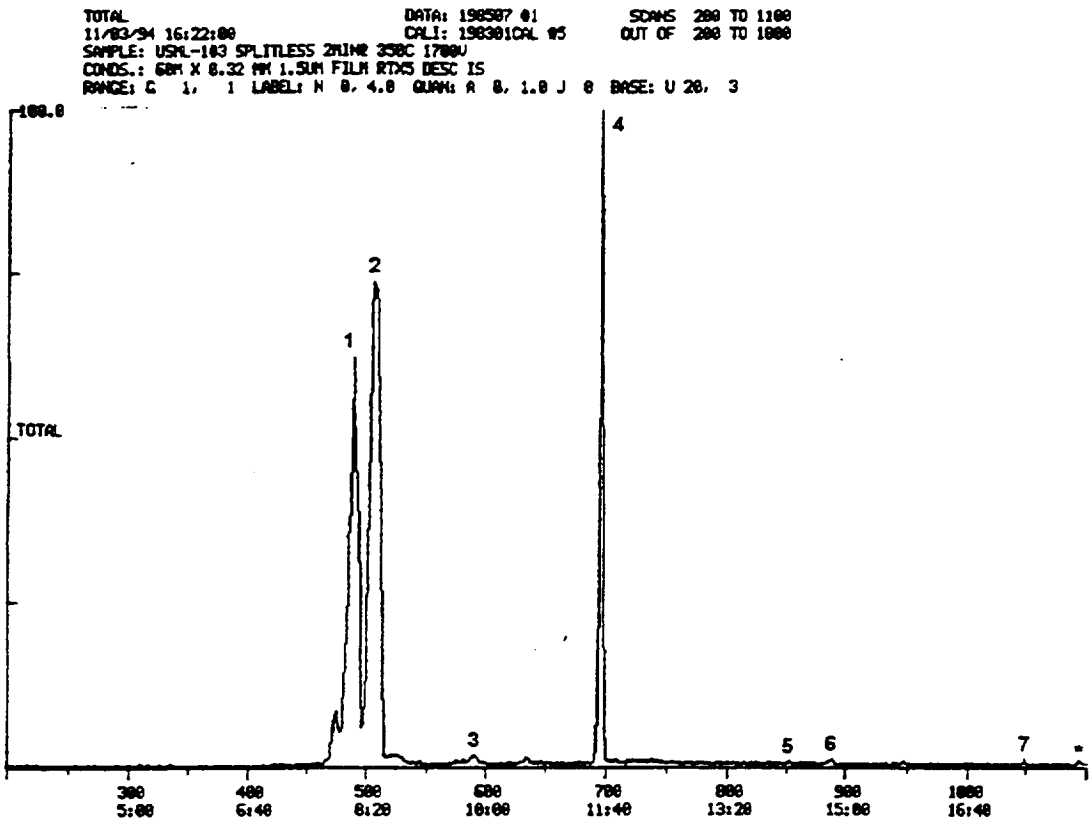
45- 300

	USML-1 #3 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	91648	1.373		b
2	Dichlorodifluoromethane	114688	1.719		b
3	Chloroethane	2920	0.044		b
4	Methylene chloride	202240	3.031		b
5	Acetic acid	4448	0.009		c
6	Benzene	2002	0.004	0.015	a
7	Toluene	1992	0.003	0.009	a
8	2-Butoxyethanol	4336	0.009		c
9	Siloxane	3144	0.007		c
10	Hydrocarbon	3308	0.007		c
11	Hydrocarbon	4656	0.010		c
12	Hydrocarbon	25088	0.053		c
13	Hydrocarbon	7056	0.015		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.

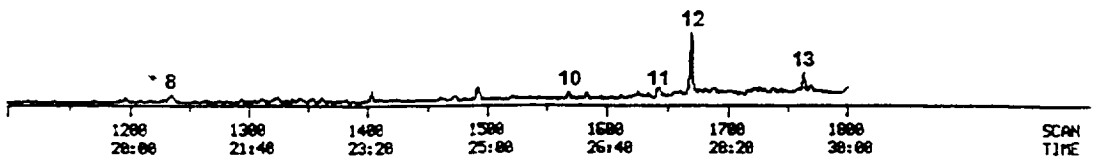


TOTAL
DATA: 198507 01
SCANS 1100 TO 1900
11/03/94 16:22:00
CALI: 198301CAL 05
OUT OF 200 TO 1000
SAMPLE: USRL-103 SPLITLESS 2MINR 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

100.0

184864.

45- 300

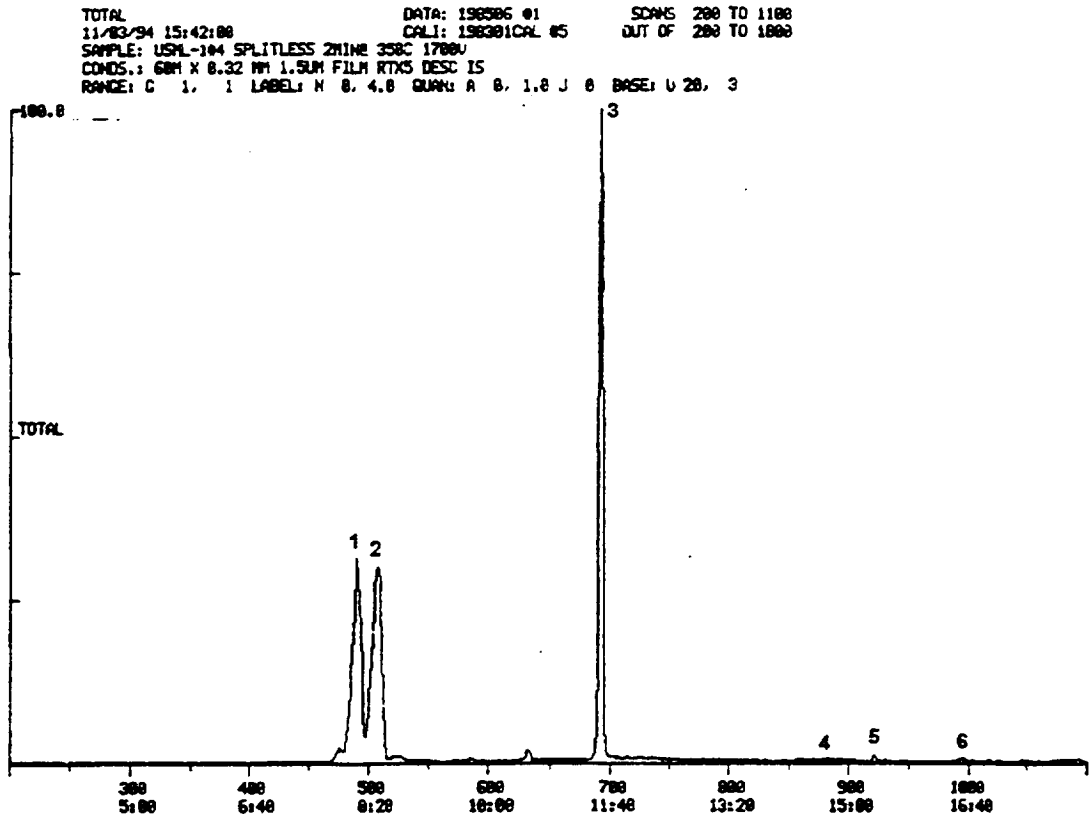


	USML-1 #4 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	128128	1.796		b
2	Dichlorodifluoromethane	131071	1.838		b
3	Methylene chloride	537600	7.537		b
4	Benzene	3008	0.005	0.022	a
5	Acetic acid	19392	0.038		c
6	1-Hydroxy-2-propanone	27456	0.054		c
7	2-Butoxyethanol	14272	0.028		c
8	Phenol + Benzaldehyde	3532	0.007		c
9	Hydrocarbon	10304	0.020		c
10	Trimethylbenzene	8528	0.017		c
11	Limonene	22304	0.044		c
12	Hydrocarbon	10896	0.021		c
13	Hydrocarbon	6336	0.012		c
14	Hydrocarbon	20960	0.041		c
15	Hydrocarbon	5624	0.011		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

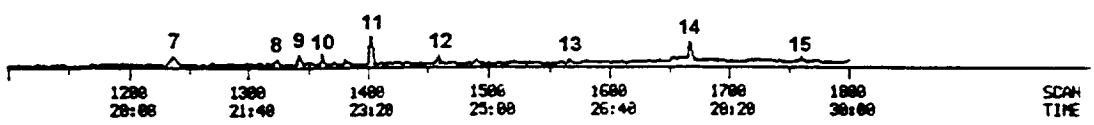
c Quantitation based on comparison to average of four non-halogenated standard compounds.



TOTAL DATA: 198506 #1 SCANS 1100 TO 1000
11/03/94 15:42:00 CAL1: 198301CAL #5 OUT OF 200 TO 1000
SAMPLE: USML-104 SPLITLESS 2MIN@ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3

100.0 489472.

45- 300



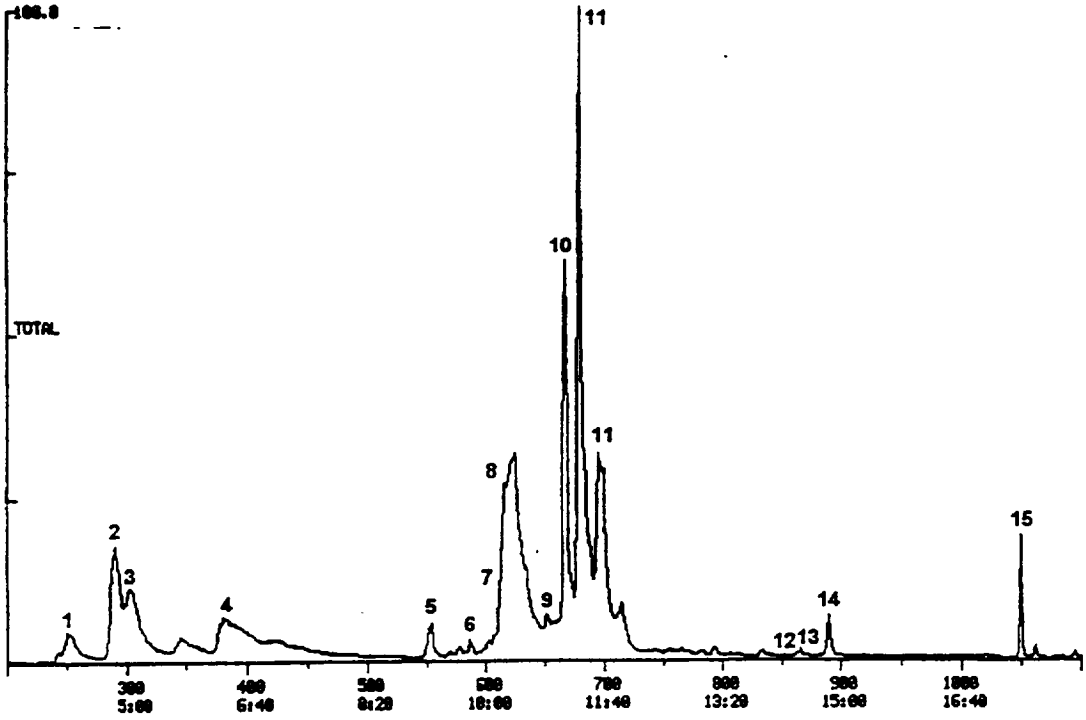
	USML-1 #5 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	32456	0.705		b
2	Chlorotrifluoromethane	162816	3.536		b
3	Dichlorodifluoromethane	45696	0.992		b
4	1,2-Dichloro-1,1,2,2-tetrafluoroethane	21856	0.475		b
5	Dichlorodifluoroethene	85504	1.857		b
6	Ethanol	4933430	52.762	1608.603	a
7	Acetone	5029640	58.520	473.465	a
8	Trichlorofluoromethane	3784	0.098	0.581	a
9	Dichloroethene	23584	0.512		b
10	1,1,2-Trichloro-1,2,2-trifluoroethane	1054710	14.706	69.239	a
11	Methylene chloride	1374462	29.850		b
12	2-Butenal	13952	0.042		c
13	Acetic acid	30368	0.092		c
14	Benzene + Cyclohexane	69248	0.196	0.774	a
15	Toluene	178432	0.365	1.160	a
16	Xylene or Ethylbenzene	8528	0.026		c
17	Styrene	3200	0.010		c
18	Benzaldehyde	17440	0.053		c
19	Methylphenol (cresol)	5384	0.016		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.

TOTAL DATA: 190505 01 SCANS 200 TO 1100
11/03/94 15:02:00 CALI: 190301CAL 05 OUT OF 200 TO 1000
SAMPLE: USML-105 SPLITLESS 2 MIN@ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

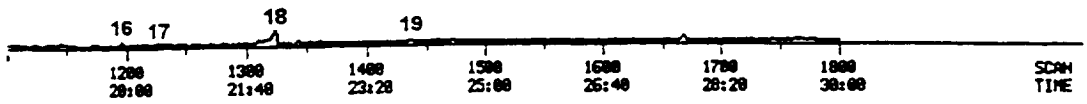


TOTAL DATA: 190505 01 SCANS 1100 TO 1000
11/03/94 15:02:00 CALI: 190301CAL 05 OUT OF 200 TO 1000
SAMPLE: USML-105 SPLITLESS 2 MIN@ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

100.0

904054.

45- 300

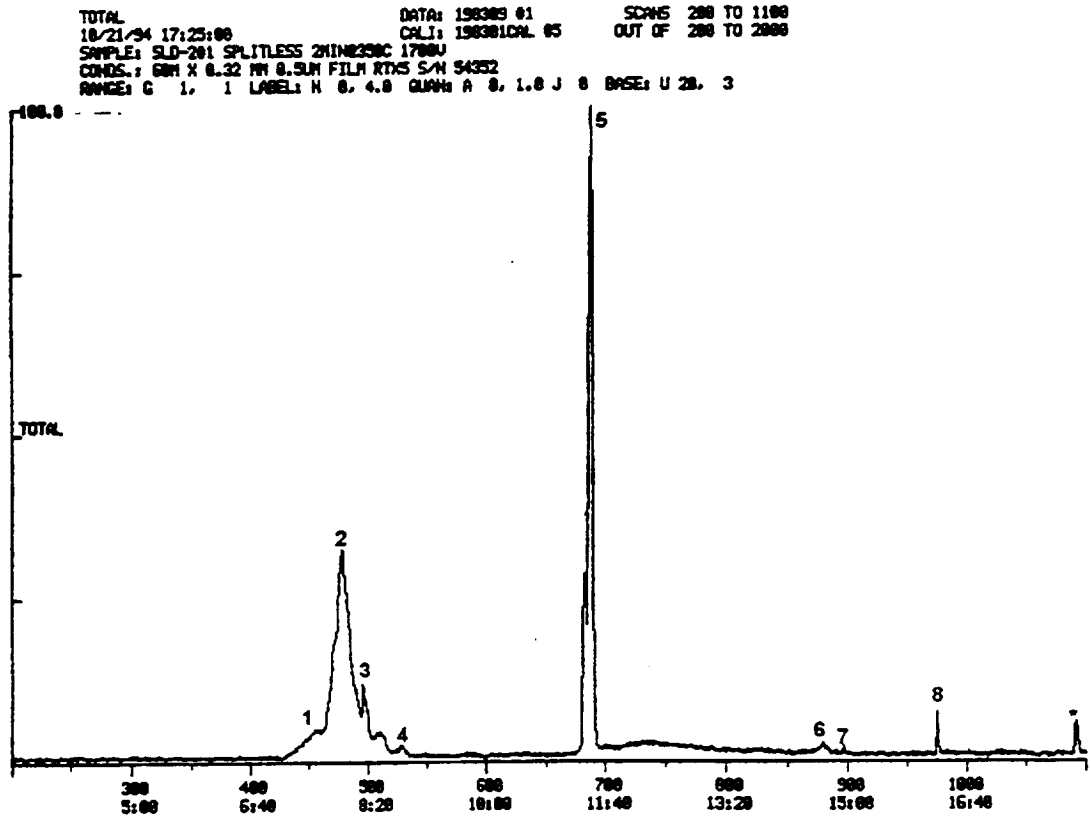


	SLD-2 #1 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Sulfur hexafluoride	37120	0.752		b
2	Bromotrifluoromethane	14064	0.285		b
3	Dichlorodifluoromethane	5800	0.117		b
4	1,2-Dichloro-1,1,2,2-tetrafluoroethane	1010	0.020		b
5	Methylene chloride	77712	1.574		b
6	Benzene	914	0.003	0.006	a
7	Acetic acid	1920	0.006		c
8	Silane	3564	0.011		c
9	2-Butoxyethanol	2948	0.009		c
10	Hydrocarbon	2280	0.007		c
11	Trimethylbenzene	1572	0.005		c
12	Limonene	2652	0.008		c
13	Hydrocarbon	1844	0.006		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

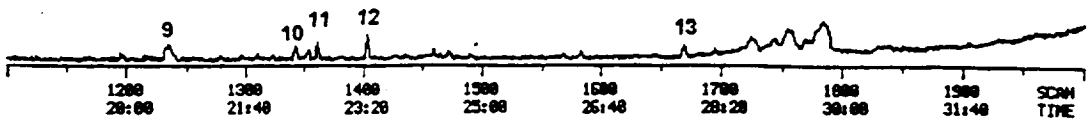
c Quantitation based on comparison to average of three non-halogenated standard compounds.



TOTAL
DATA: 198389 01
SCANS 1100 TO 2000
10/21/94 17:25:00
CALI: 198381CAL 05
OUT OF 200 TO 2000
SAMPLE: SLD-201 SPLITLESS 2MIN@230C 170@U
CONDS.: 60M X 0.32 MM 0.5UM FILM RTX5 S/N 54352
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3
100.0

71296.

45- 300



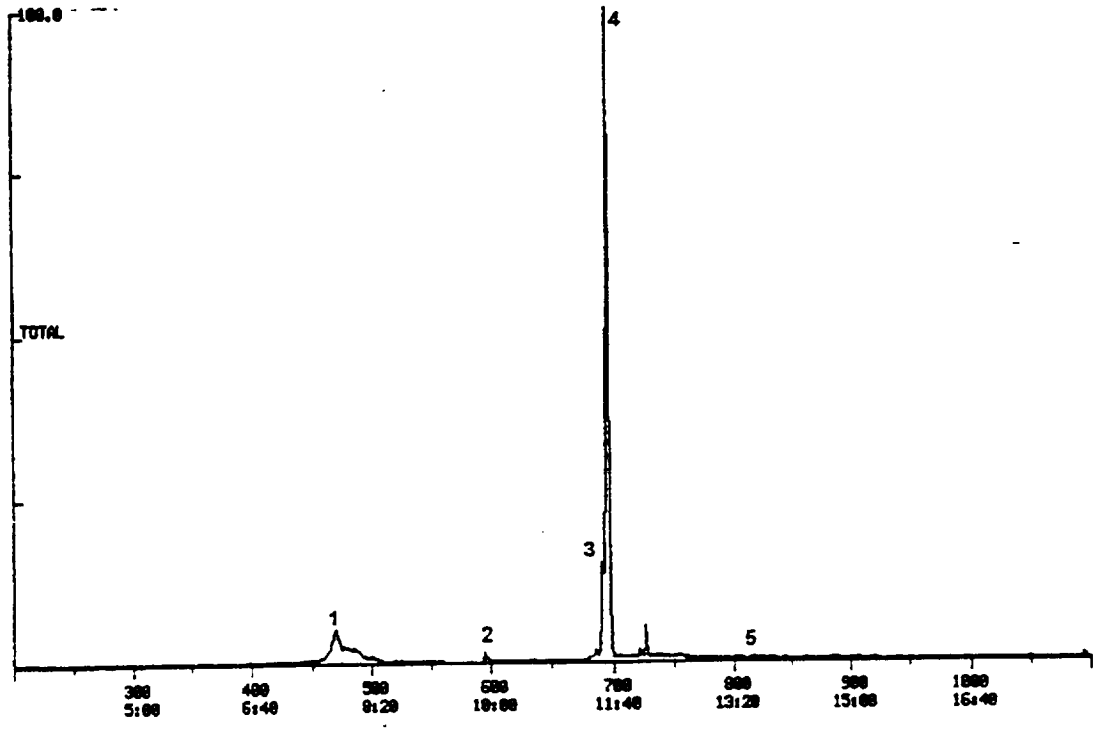
	SLD-2 #2 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	11168	0.222		b
2	Acetic acid	14496	0.045		c
3	1,1,2-Trichloro-1,2,2-trifluoroethane	6056	0.077	0.143	a
4	Methylene chloride	356864	7.103		b
5	Trichloromethane	1672	0.033		b
6	Trimethylbenzene	847	0.003		c
7	Unknown siloxane	7720	0.024		c
8	Caprolactam	2568	0.008		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of three non-halogenated standard compounds.

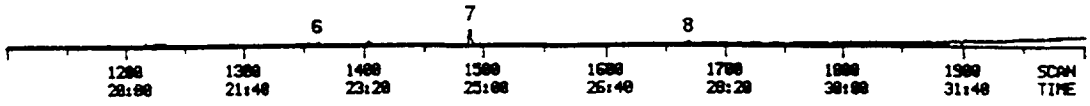
TOTAL DATA: 198308 01 SCANS 200 TO 1100
10/21/94 16:38:00 CALI: 198301CAL 05 OUT OF 200 TO 2000
SAMPLE: SLD-202 SPLITLESS 2MIN@250C 170@ U
CONDS.: 60M X 0.32 MM 0.5UM FILM RTX5 S/N 54352
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



TOTAL DATA: 198308 01 SCANS 1100 TO 2000
10/21/94 16:38:00 CALI: 198301CAL 05 OUT OF 200 TO 2000
SAMPLE: SLD-202 SPLITLESS 2MIN@250C 170@ U
CONDS.: 60M X 0.32 MM 0.5UM FILM RTX5 S/N 54352
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

100.0 343048.

45- 300

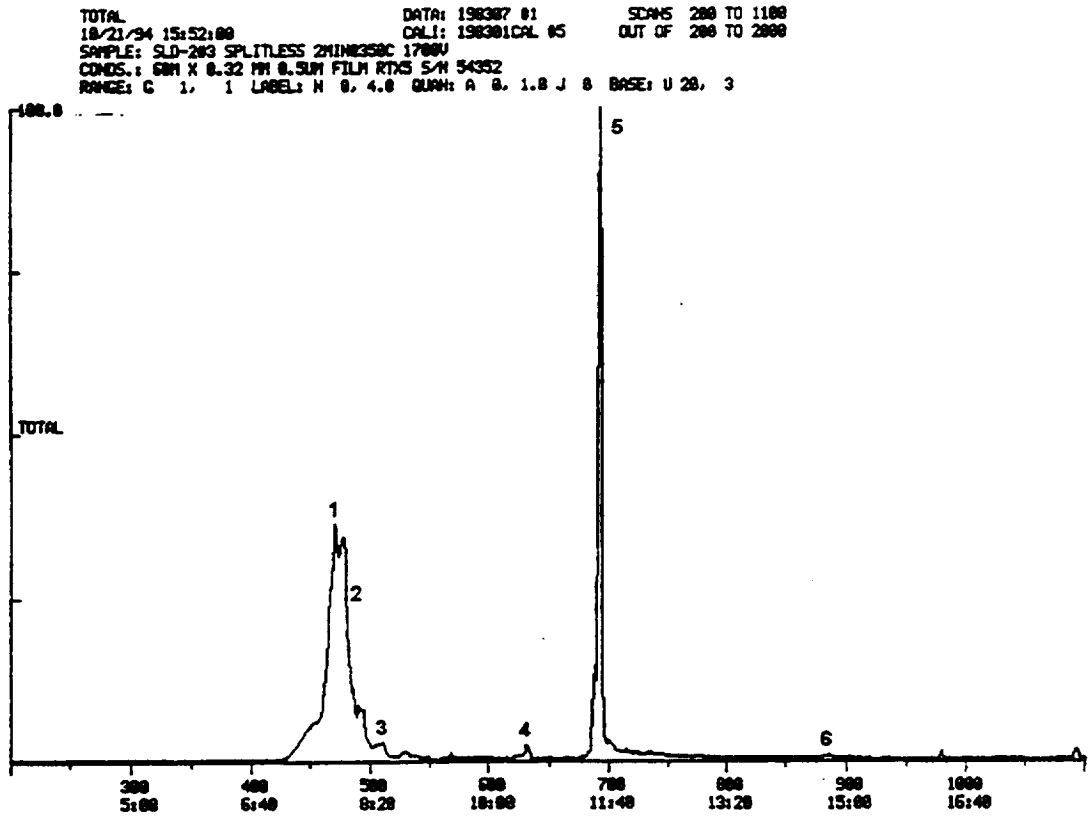


	SLD-2 #3 Compounds Identified				
Peak No..	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Sulfur hexafluoride	62592	1.360		b
2	Bromotrifluoromethane	22688	0.493		b
3	Dichlorodifluoromethane	4744	0.103		b
4	Trichlorofluoromethane	5240	0.126	0.750	a
5	Methylene chloride	229888	4.996		b
6	Benzene	971	0.003	0.014	a

a Quantitation based on an actual standard compound.

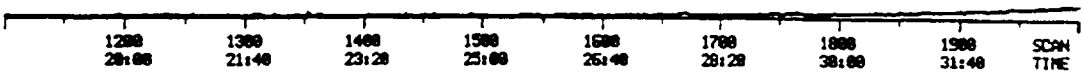
b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of three non-halogenated standard compounds.



TOTAL
DATA: 198307 01
SCANS 1100 TO 2000
10/21/94 15:52:00
CALI: 198301CAL 05
OUT OF 200 TO 2000
SAMPLE: SLD-203 SPLITLESS 2MIN@250C 170@V
CONDS.: 60M X 0.32 MM 0.5UM FILM RTX5 S/N 54352
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0

221440.



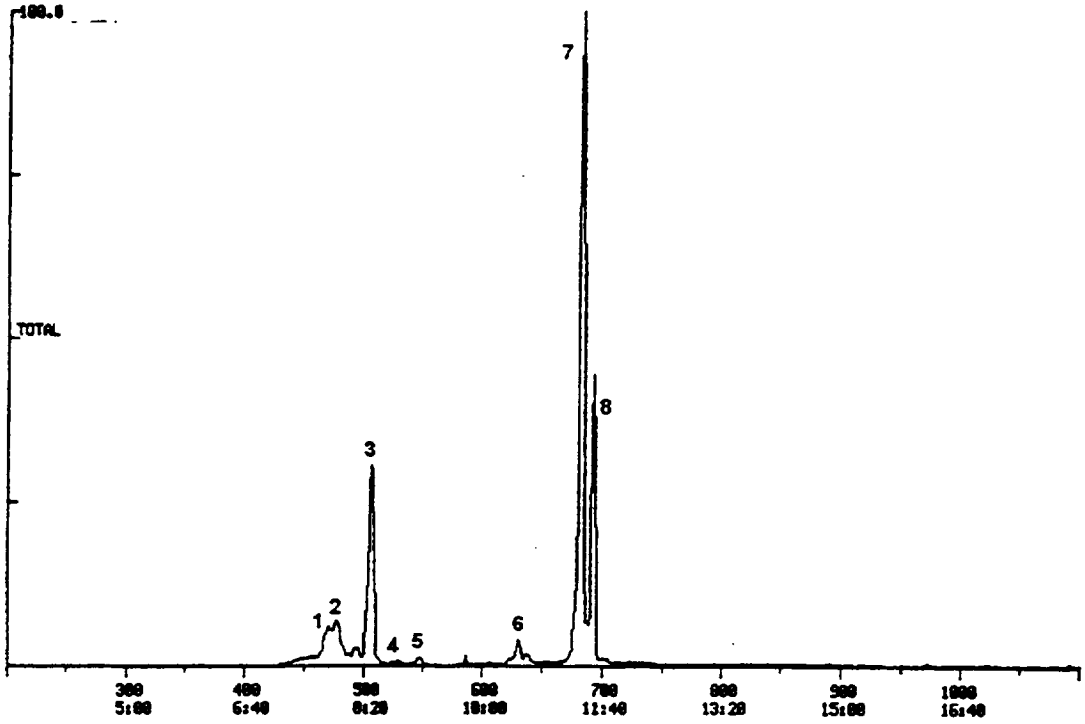
	SLD-2 #4 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Sulfur hexafluoride	23680	0.416		b
2	Bromotrifluoromethane	18816	0.330		b
3	Chlorotrifluoroethene	302080	5.301		b
4	1,1-Dichloro-1,1,2,2-tetrafluoroethane	3932	0.069		b
5	2-Methyl-1-propene	20192	0.055		c
6	Trichlorofluoromethane	26560	0.516	3.068	a
7	1,1,2-Trichloro-1,2,2-trifluoroethane	705536	7.890	37.146	a
8	Methylene chloride	398848	6.999		b
9	Xylene or Ethylbenzene	2108	0.006		c
10	Trimethylbenzene	2568	0.007		c
11	4-Ethenyl-1,4-dimethylcyclohexene	3280	0.009		c
12	Hydrocarbon	1330	0.004		c
13	Nonanal	2760	0.008		c
14	Decanal	2824	0.008		c
15	Methenamine	5320	0.014		c
16	Hydrocarbon	4576	0.012		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of three non-halogenated standard compounds.

TOTAL DATA: 198306 @1 SCANS 200 TO 1100
10/21/94 15:09:00 CALI: 198301CAL @5 OUT OF 200 TO 2000
SAMPLE: SLO-204 SPLITLESS 2MIN@350C 1700V
CONDS.: 60M X 0.32 MM 0.5UM FILM RTX5 S/N 54352
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

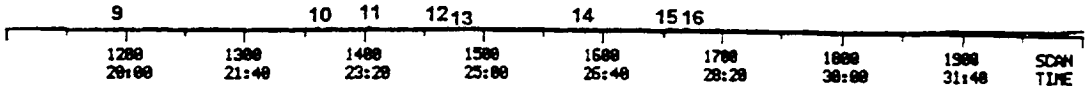


TOTAL DATA: 198306 @1 SCANS 1100 TO 2000
10/21/94 15:09:00 CALI: 198301CAL @5 OUT OF 200 TO 2000
SAMPLE: SLO-204 SPLITLESS 2MIN@350C 1700V
CONDS.: 60M X 0.32 MM 0.5UM FILM RTX5 S/N 54352
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

100.0

782336.

45- 300

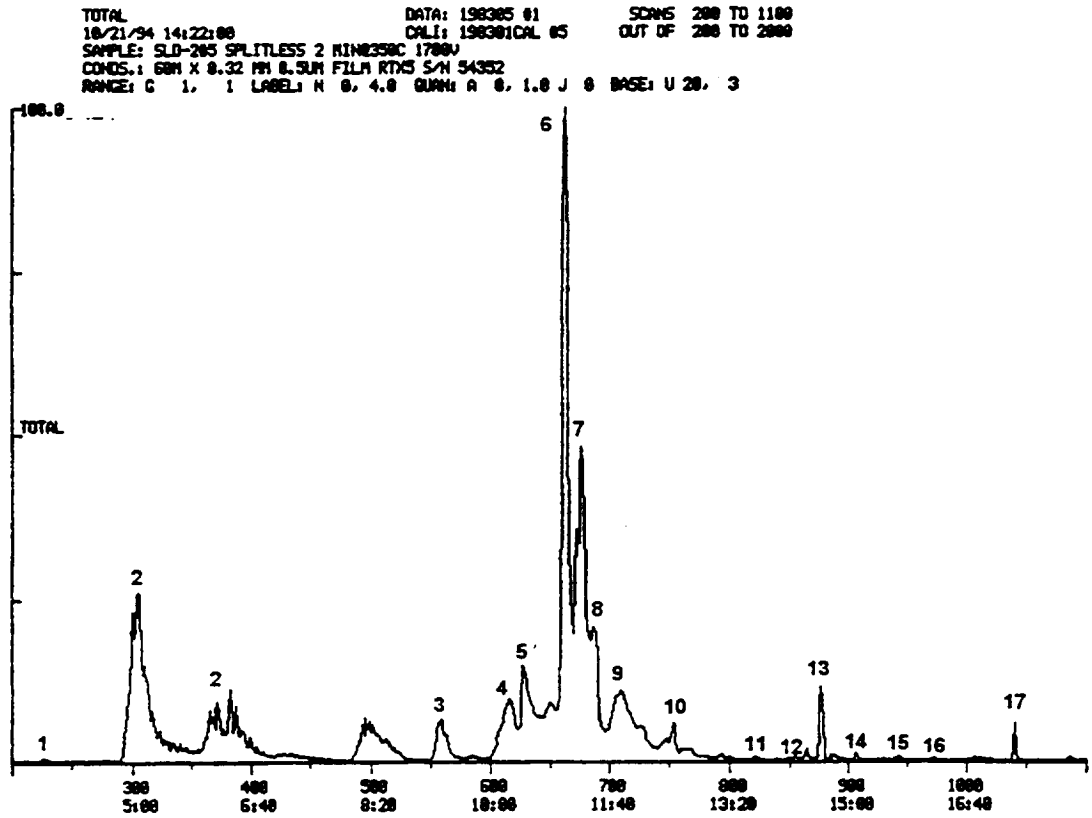


	SLD-2 #5 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Sulfur hexafluoride	12560	0.237		b
2	Chlorotrifluoroethene	758784	14.331		b
3	1,2-Dichloro-1,2-difluoroethene	162816	3.075		b
4	BP 59, 43(65)	231680	0.679		c
5	BP 58, 42(55), 77(10)	576512	1.689		c
6	1,1,2-Trichloro-1,2,2-trifluoroethane	2863100	34.459	162.235	a
7	Methylene chloride	543744	10.270		b
8	Trichlorotrifluoroethane	901120	17.020		b
9	BP 43, 59(30)	541696	1.587		c
10	BP 75	149248	0.437		c
11	Methylcyclopentane	33600	0.098		c
12	Silane	23840	0.070		c
13	Benzene + Cyclohexane	470528	1.440	5.695	a
14	Cyclohexene	34816	0.102		c
15	Acetic acid	78336	0.229		c
16	Methylcyclohexane	18368	0.054		c
17	Toluene	181504	0.510	1.621	a
18	Xylene or Ethylbenzene	6944	0.020		c
19	Xylene	12112	0.035		c
20	BP 133, 151(60)	5608	0.016		c
21	Styrene	4936	0.014		c
22	Dimethylfuranone	5560	0.016		c
23	Siloxane, BP 281	6280	0.018		c
24	4-Ethenyl-1,4-dimethylcyclohexene	16544	0.048		c
25	Substituted cyclohexane, BP 83, 125(55)	16704	0.049		c
26	Methenamine	87168	0.255		c

a Quantitation based on an actual standard compound.

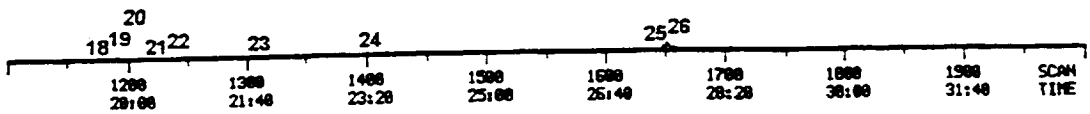
b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of three non-halogenated standard compounds.

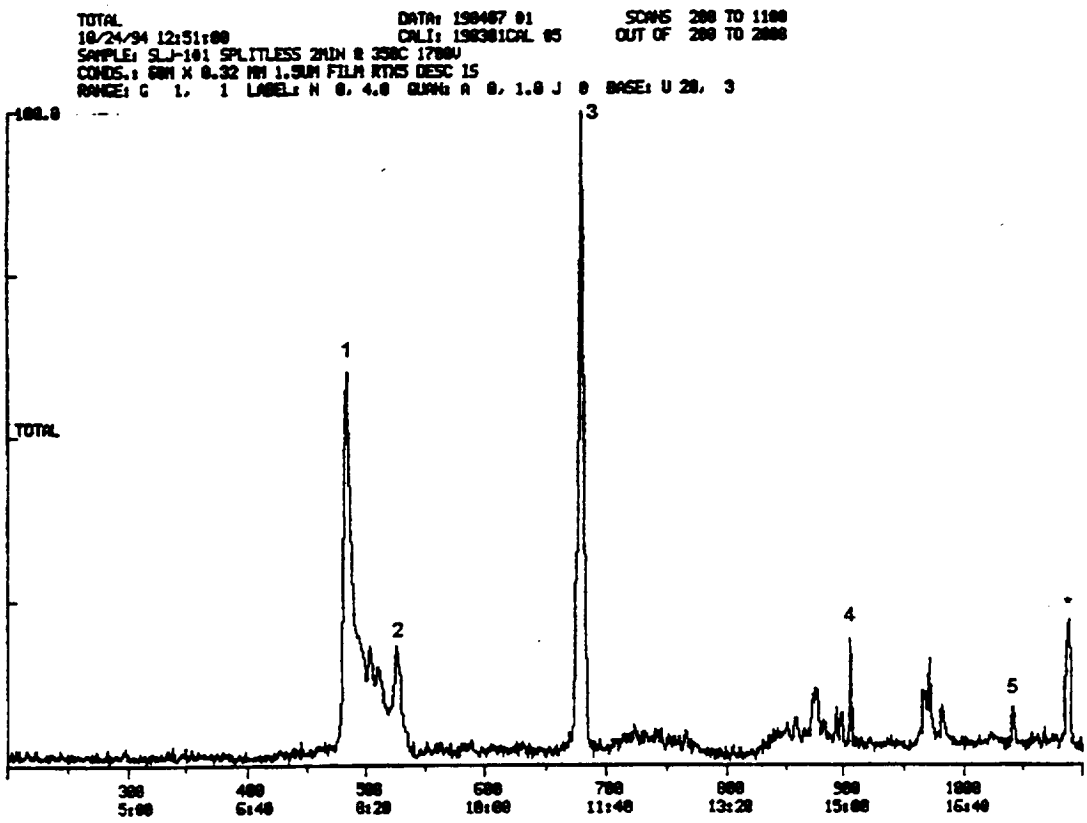


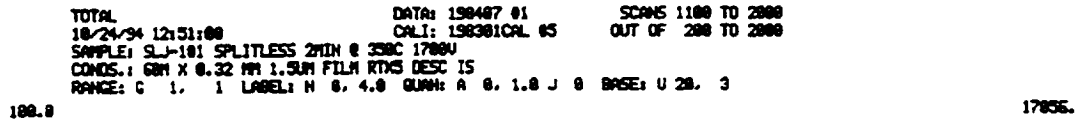
TOTAL
10/21/94 14:22:00
DATA: 198305 01
CALI: 198301CAL 05
SCANS 1100 TO 2000
OUT OF 200 TO 2000
SAMPLE: SLD-205 SPLITLESS 2 MIN@350C 1700V
CONDS.: 60M X 0.32 MM 0.5UM FILM RTX5 S/N 54352
RANGE: C 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3
100.0

2887678.



	SLJ-1 #1 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	13344	0.297		b
2	1,2-Dichloro-1,2,2,2-tetrafluoroethane	1586	0.035		b
3	Methylene chloride	18432	0.411		b
4	Acetic acid	9616	0.045		c
5	Toluene	1142	0.004	0.011	a
6	Xylene or Ethylbenzene	1290	0.006		c
7	2-Butoxyethanol	3332	0.016		c
8	Phenol + Benzaldehyde	2116	0.010		c
9	Trimethylbenzene	1610	0.008		c
a Quantitation based on an actual standard compound.					
b Quantitation based on comparison to average of three halogenated standard compounds.					
c Quantitation based on comparison to average of four non-halogenated standard compounds.					


TOTAL
DATA: 198487 01
SCANS 200 TO 1100
10/24/94 12:51:00
CALI: 198381CAL 05
OUT OF 200 TO 2000
SAMPLE: SLJ-101 SPLITLESS 2MIN @ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTMS DESC 15
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3
100.0
TOTAL
1
2
3
4
5
300
5:00
400
6:40
500
8:20
600
10:00
700
11:40
800
13:20
900
15:00
1000
16:40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DATA: 198487 01
SCANS 1100 TO 2000
10/24/94 12:51:00
CALI: 198381CAL 05
OUT OF 200 TO 2000
SAMPLE: SLJ-101 SPLITLESS 2MIN @ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTMS DESC 15
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3
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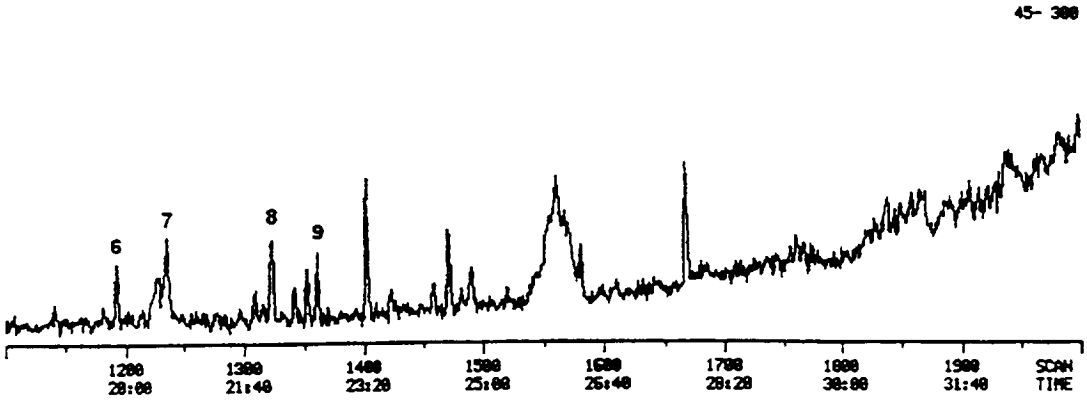
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1900
31:40
SCAN
TIME

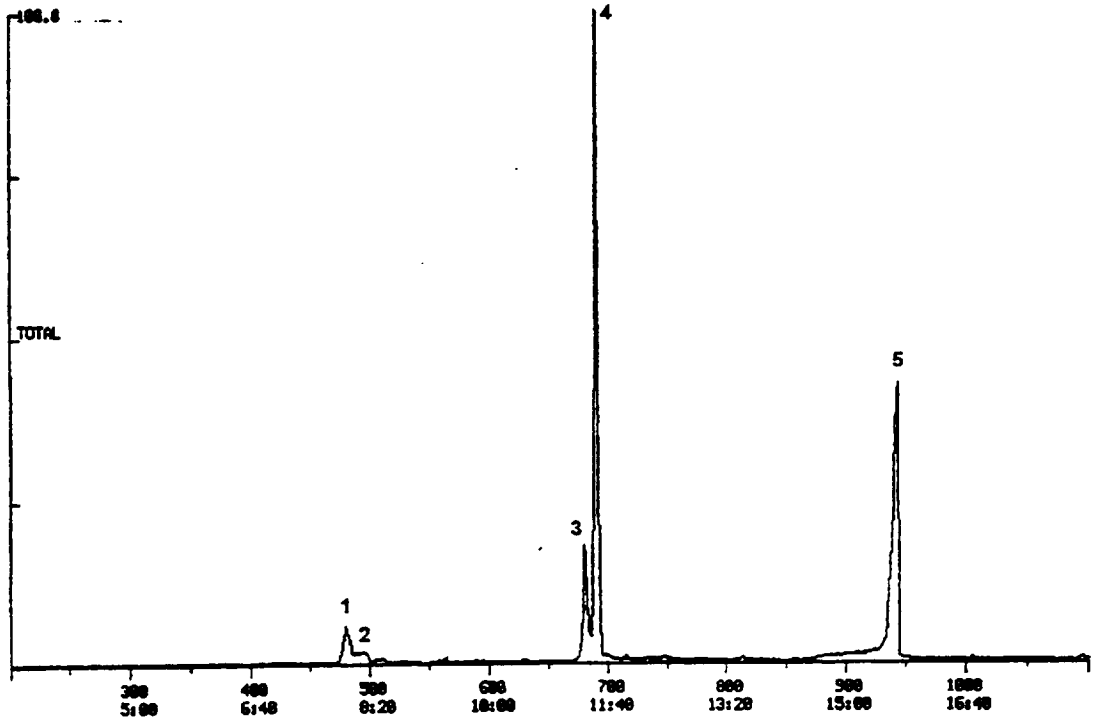
	SLJ-1 #2 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	16016	0.239		b
2	Dichlorodifluoromethane	2336	0.035		b
3	1,1,2-Trichloro-1,2,2-trifluoroethane	54784	0.441	0.823	a
4	Methylene chloride	321024	4.783		b
5	Acetic acid	540672	1.701		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.

TOTAL DATA: 190406 01 SCANS 200 TO 1100
10/24/94 11:50:00 CALI: 190301CAL 05 OUT OF 200 TO 2000
SAMPLE: SLJ-102 SPLITLESS 2MIN @ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

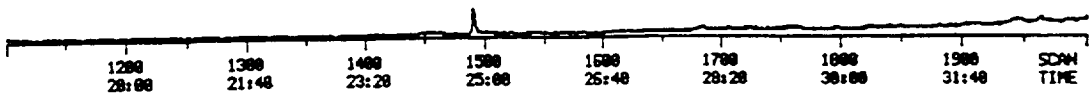


TOTAL DATA: 190406 01 SCANS 1100 TO 2000
10/24/94 11:50:00 CALI: 190301CAL 05 OUT OF 200 TO 2000
SAMPLE: SLJ-102 SPLITLESS 2MIN @ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

100.0

290816.

45- 300



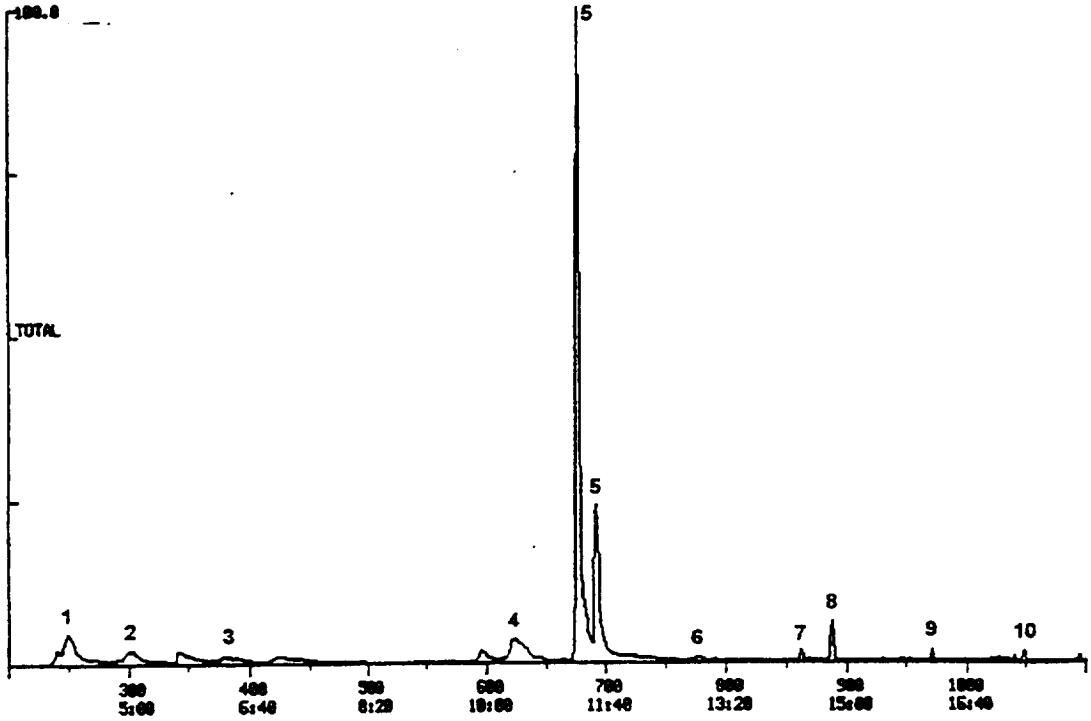
	SLJ-1 #3 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	44576	0.892		b
2	Dichlorodifluoromethane	45120	0.903		b
3	1,2-Dichloro-1,1,2,2-tetrafluoroethane	4944	0.099		b
4	Furan	42624	0.180		c
5	Methylene chloride	942080	18.857		b
6	3-methylpentane	8160	0.034		c
7	2-butenal	33728	0.143		c
8	Benzene	55552	0.203	0.802	a
9	Acetic acid	36352	0.154		c
10	Toluene	18528	0.055	0.175	a
11	Xylene or Ethylbenzene	8768	0.037		c
12	2(3H)-Furanone	3492	0.015		c
13	Cyclohexanone	4608	0.019		c
14	Hexanoic acid	9920	0.042		c
15	Benzaldehyde	28064	0.119		c
16	Trimethylbenzene	4832	0.020		c
17	Nonanal	6752	0.029		c
18	Benzoic acid	6688	0.028		c
19	Caprolactam	60160	0.254		c
20	1-Decanol	11664	0.049		c
21	Dodecanoic acid	11808	0.050		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.

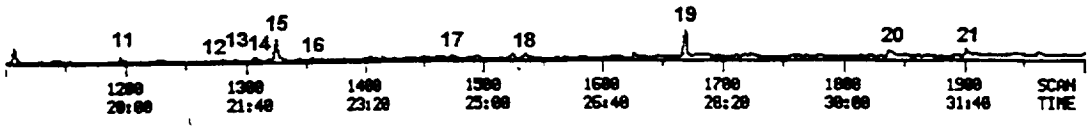
TOTAL DATA: 190485 01 SCANS 200 TO 1100
10/24/94 11:06:00 CALI: 190301CAL 05 OUT OF 200 TO 2000
SAMPLE: SLJ-103 SPLITLESS 2 MIN@350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3



TOTAL DATA: 190485 01 SCANS 1100 TO 2000
10/24/94 11:06:00 CALI: 190301CAL 05 OUT OF 200 TO 2000
SAMPLE: SLJ-103 SPLITLESS 2 MIN@350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3

100.0 876544.

45- 300



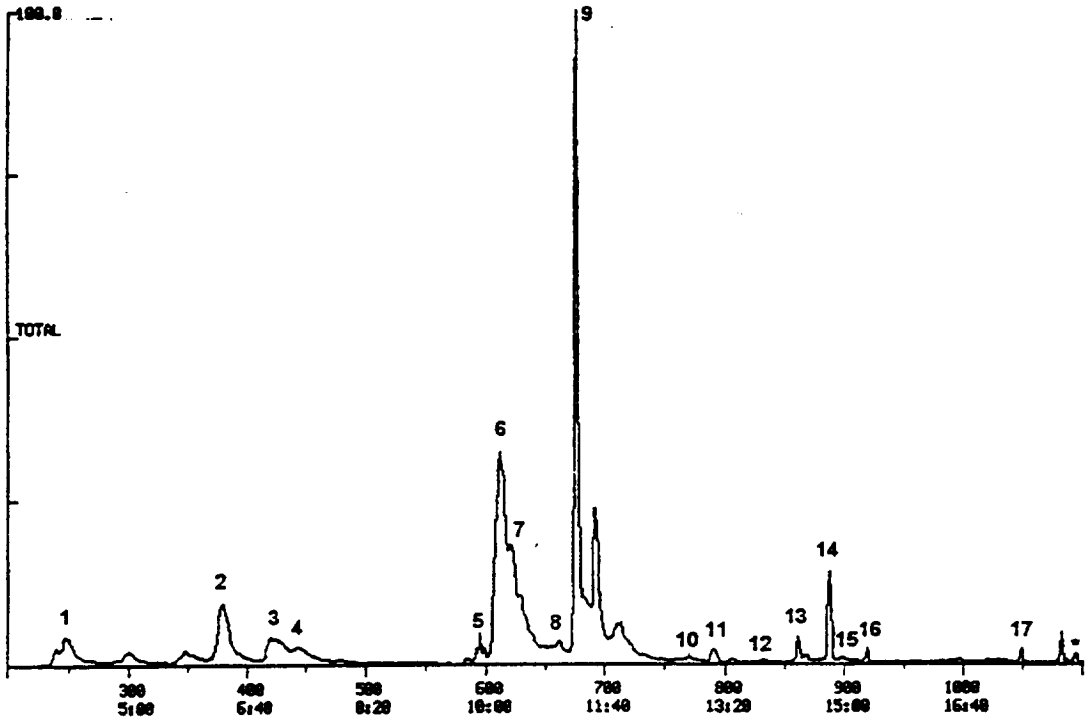
	SLJ-1 #4 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	26336	0.566		b
2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	45504	0.979		b
3	Unknown, BP 41, 56(20)	98176	0.446		c
4	Unknown chlorofluorocarbon	23424	0.504		b
5	Unknown, BP 45, 77(15)	121984	0.554		c
6	Acetone	361984	4.825	39.037	a
7	Furan	79360	0.360		c
8	Unknown, BP 45	588800	2.673		c
9	Methylene chloride	711680	15.305		b
10	Butanal	28928	0.131		c
11	2-Methylfuran	16000	0.073		c
12	Tetrahydrofuran	7352	0.033		c
13	2-Butenal	58816	0.267		c
14	Benzene	101376	0.398	1.572	a
15	1-Butanol	10496	0.081	0.241	a
16	Acetic acid	54464	0.247		c
17	Toluene	15056	0.048	0.153	a
18	Methyl-(1H)-pyrrole	2396	0.011		c
19	Xylene or Ethylbenzene	9216	0.042		c
20	Styrene	2308	0.010		c
21	Phenol + Benzaldehyde	29952	0.136		c
22	Methylphenol	5072	0.023		c
23	Methylbenzaldehyde	5264	0.024		c
24	Caprolactam	17696	0.080		c
25	Unknown fatty acid	12368	0.056		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.

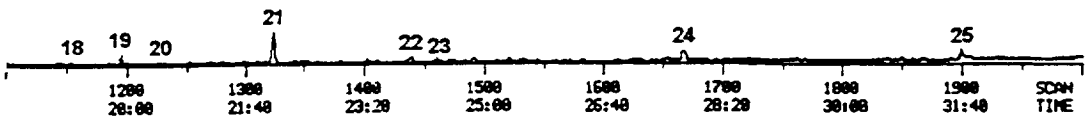
TOTAL DATA: 190404 01 SCANS 200 TO 1100
10/24/94 10:15:00 CALI: 190301CAL #5 OUT OF 200 TO 2000
SAMPLE: SLJ-104 SPLITLESS 2 MIN@ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



TOTAL DATA: 190404 01 SCANS 1100 TO 2000
10/24/94 10:15:00 CALI: 190301CAL #5 OUT OF 200 TO 2000
SAMPLE: SLJ-104 SPLITLESS 2 MIN@ 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

100.0 65Z200.

45- 300

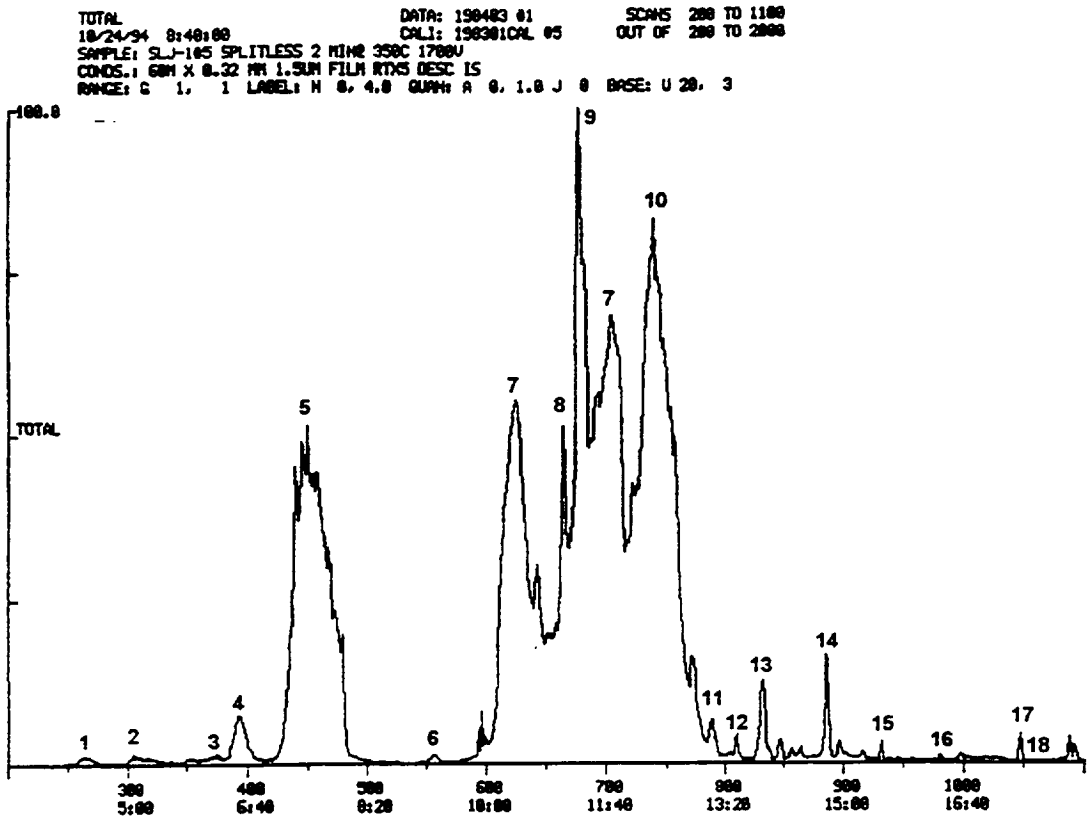


	SLJ-1 #5 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	12256	0.284		b
2	Chlorotrifluoroethene	6688	0.155		b
3	1-Propene	16832	0.082		c
4	1,2-Dichloro-1,1,2,2-tetrafluoroethane	46912	1.088		b
5	2-Butene	206848	1.013		c
6	1,2-Dichloro-1,2-difluoroethene	11920	0.276		b
7	Acetone	9730340	139.889	1131.791	a
8	1,1,2-Trichloro-1,2,2-trifluoroethane	301568	3.783	17.810	a
9	Methylene chloride	542720	12.589		b
10	Isopropyl alcohol	33066900	3547.509	75639.853	a
11	2-Methylfuran	55168	0.270		c
12	Silane	35904	0.176		c
13	Tetrahydrofuran	459776	2.251		c
14	Benzene + Cyclohexane	208128	0.880	3.482	a
15	Acetic acid	93056	0.456		c
16	Methylcyclohexane	12208	0.060		c
17	Toluene	35264	0.122	0.386	a
18	5-Methyl-1-heptene	3784	0.019		c
19	Xylene or Ethylbenzene	13008	0.064		c
20	Styrene	7640	0.037		c
21	Cyclohexanone	6312	0.031		c
22	Phenol + Benzaldehyde	19424	0.095		c
23	3-Methyl-2(5H)-furanone	14384	0.070		c
24	Limonene	4400	0.022		c
25	Methylphenol	10032	0.049		c
26	BP 44, 57(60), 73(50)	21120	0.103		c
27	Benzoic acid	5704	0.028		c
28	Benzenepropanenitrile	3628	0.018		c
29	Methenamine	19712	0.097		c
30	Caprolactam	37312	0.183		c
31	Aliphatic alcohol	14528	0.071		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.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10/24/94 8:40:00
CALI: 198301CAL 05
OUT OF 200 TO 2000
SAMPLE: SLJ-105 SPLITLESS 2 MINS 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3
100.0
TOTAL
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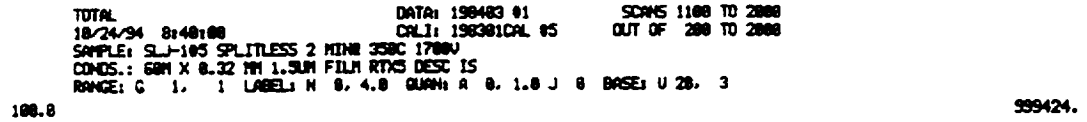
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10/24/94 8:40:00
CALI: 198301CAL 05
OUT OF 200 TO 2000
SAMPLE: SLJ-105 SPLITLESS 2 MINS 350C 1700V
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
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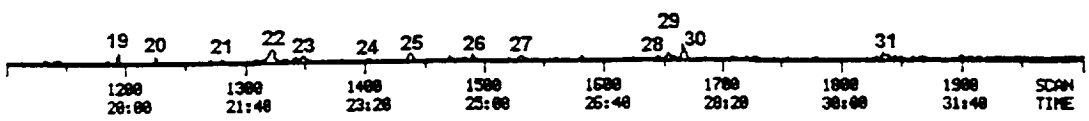
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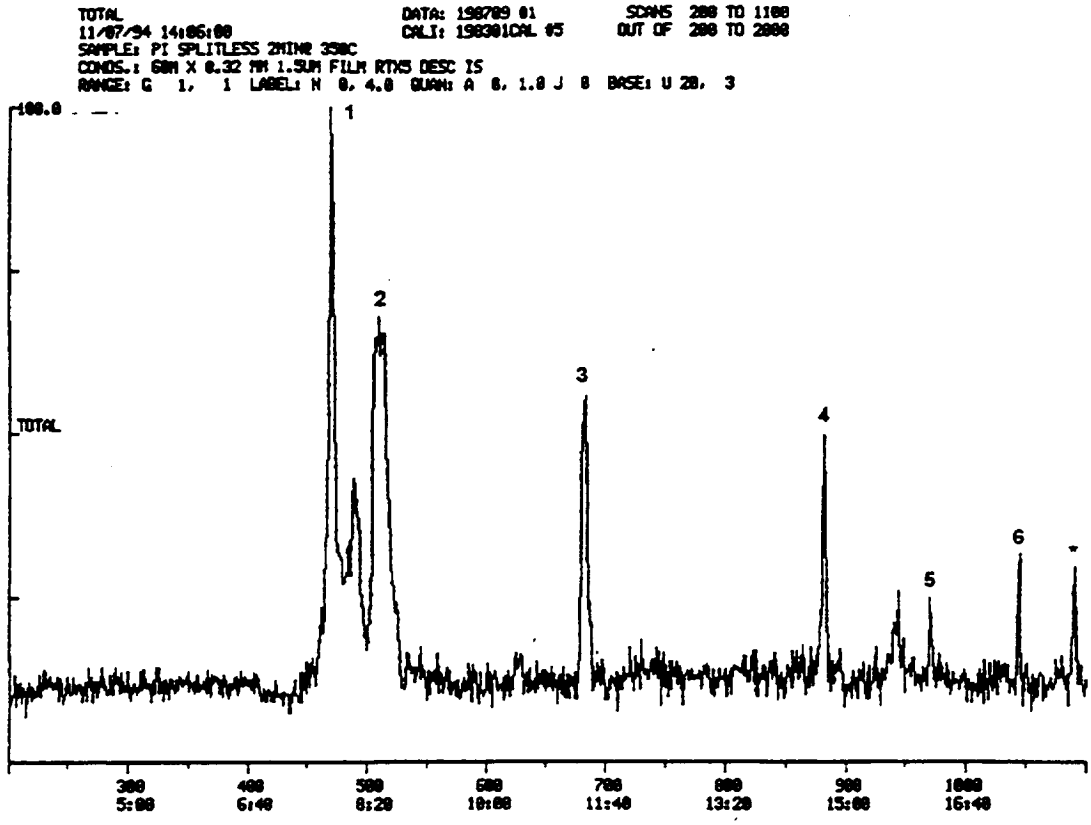
SCAN
TIME

	P-1-STS-58 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Bromotrifluoromethane	5736	0.094		b
2	1,1-Dichloro-1,1,2,2-tetrafluoroethane	1542	0.025		b
3	Methylene chloride	4472	0.073		b
4	Benzene	2980	0.008	0.015	a
5	1-Hydroxy-2-propanone	3604	0.008		c
6	Toluene	1640	0.002	0.007	a
7	Xylene or Ethylbenzene	3356	0.007		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.


TOTAL
11/07/94 14:06:00
SAMPLE: PI SPLITLESS 2MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3
DATA: 198709 01
CALI: 198301CAL 05
SCANS 200 TO 1100
OUT OF 200 TO 2000
100.0
TOTAL
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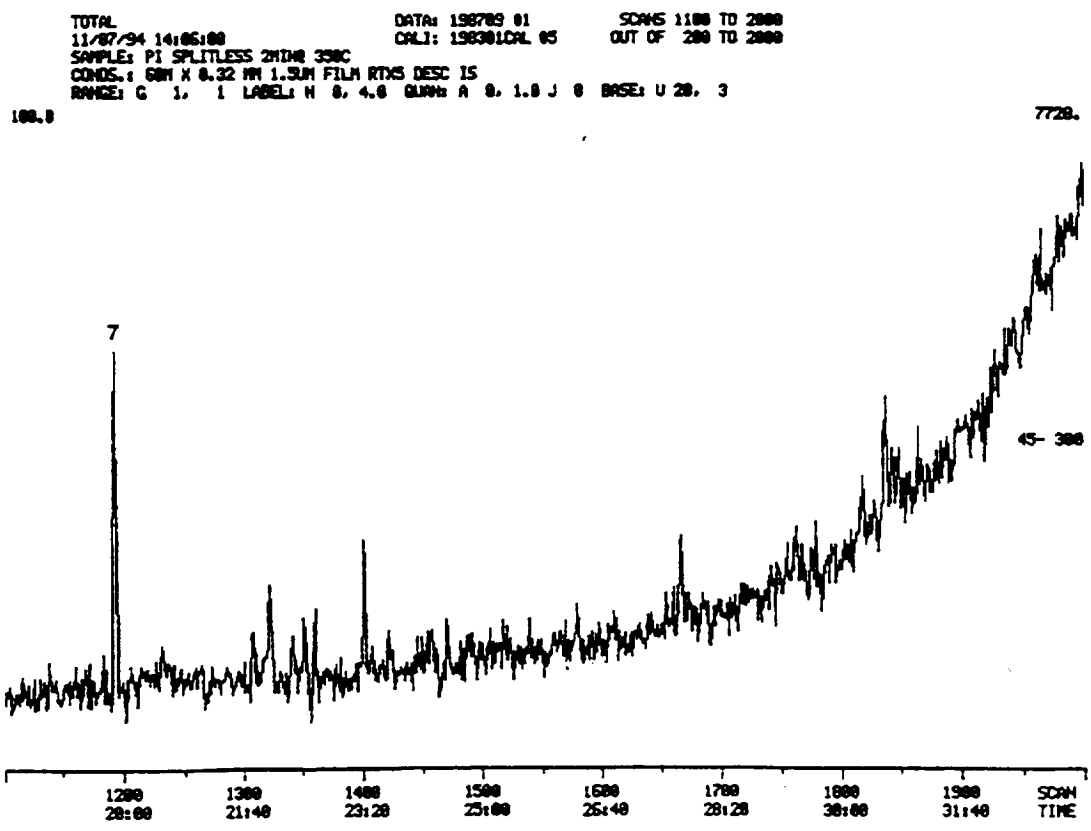
TOTAL
11/07/94 14:06:00
SAMPLE: PI SPLITLESS 2MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3
DATA: 198709 01
CALI: 198301CAL 05
SCANS 1100 TO 2000
OUT OF 200 TO 2000
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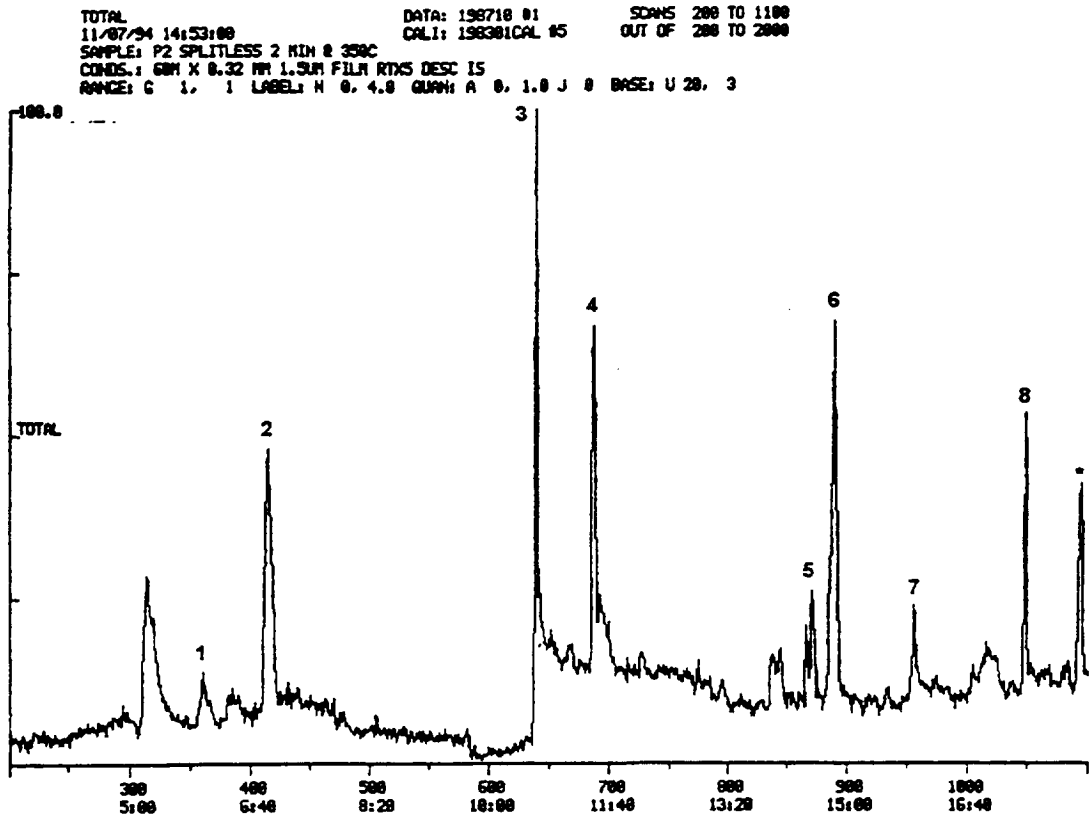
SCAN
TIME

	P-2-STS-58 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Dichlorodifluoromethane	1164	0.016		b
2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	7144	0.098		b
3	Unknown, BP 43, 77(20)	84864	0.153		c
4	Methylene chloride	10656	0.145		b
5	Acetic acid	5744	0.010		c
6	Benzene	11536	0.025	0.048	a
7	1-Hydroxy-2-propanone	5904	0.011		c
8	Toluene	8352	0.011	0.032	a
9	Xylene or Ethylbenzene	5520	0.010		c
10	Styrene	4512	0.008		c
11	Phenol	6048	0.011		c
12	Benzaldehyde	2928	0.005		c
13	Benzonitrile	1980	0.004		c
14	Trimethylbenzene	2668	0.005		c
15	Benzeneacetaldehyde	2792	0.005		c
16	Methylphenol	5248	0.009		c
17	Benzeneacetonitrile	2600	0.005		c
18	Naphthalene	2696	0.005		c
19	Benzenepropanenitrile	4184	0.008		c
20	Hydrocarbon	5664	0.010		c
21	MW 134, substituted benzene	3960	0.007		c
22	Methylbenzonitrile	7680	0.014		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.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DATA: 198710 01
CALI: 198301CAL 05
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OUT OF 200 TO 2000
SAMPLE: P2 SPLITLESS 2 MIN @ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
TOTAL
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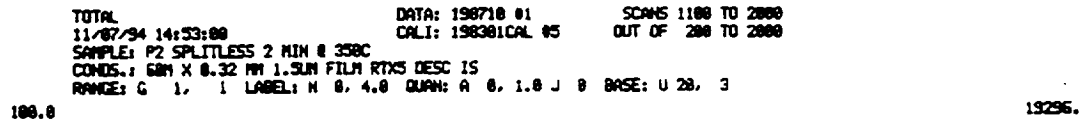
TOTAL
11/07/94 14:53:00
DATA: 198710 01
CALI: 198301CAL 05
SCANS 1100 TO 2000
OUT OF 200 TO 2000
SAMPLE: P2 SPLITLESS 2 MIN @ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
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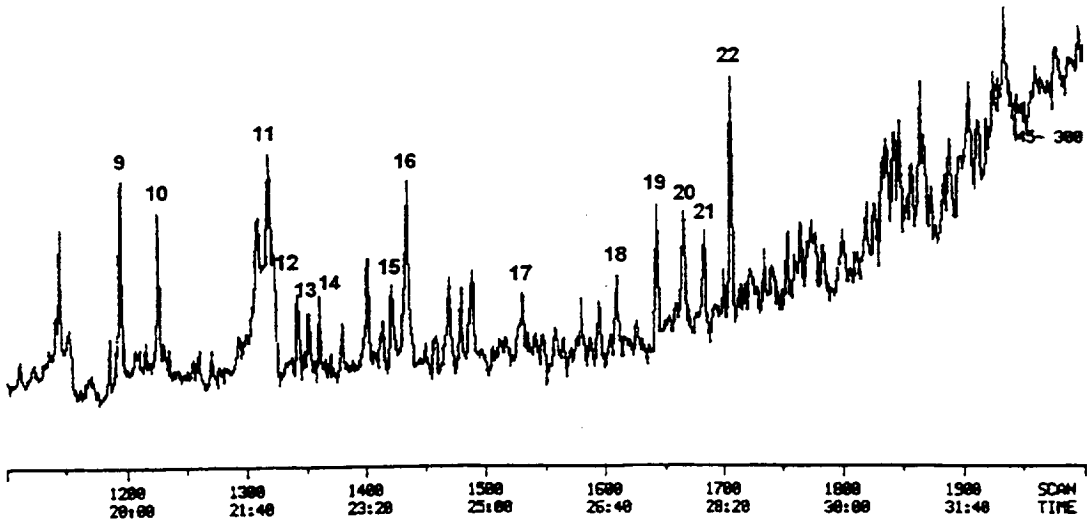
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SCAN
TIME

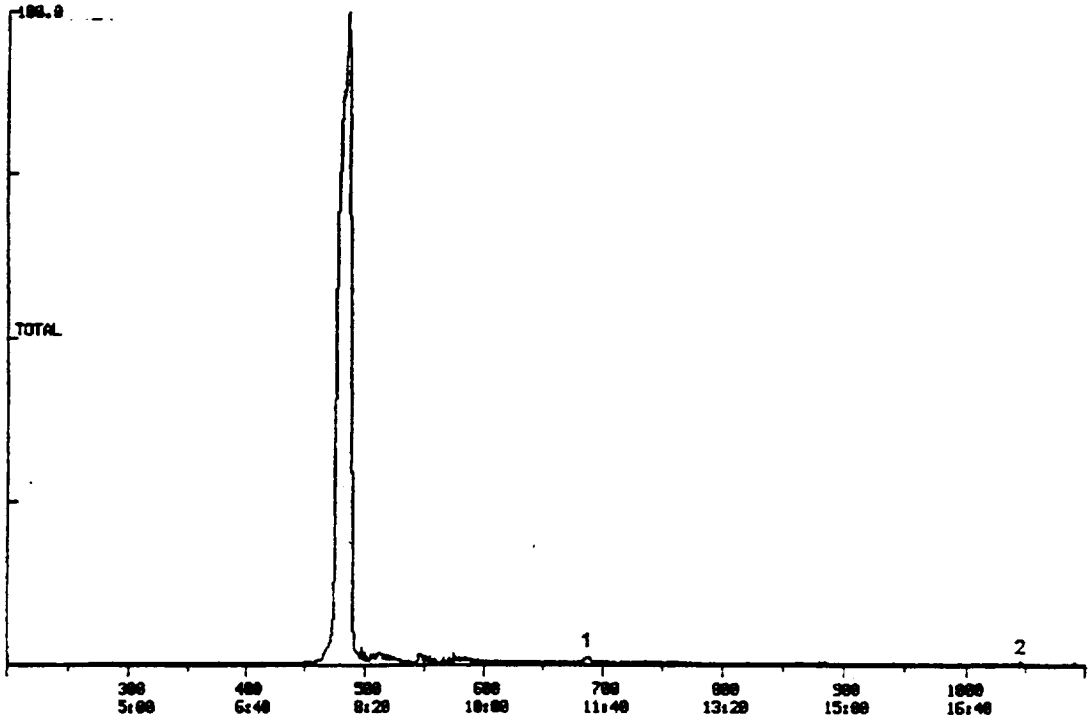
	P-3-STS-58 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	Methylene chloride	2704	0.000		b
2	Toluene	2384	0.003	0.008	a
3	Xylene or Ethylbenzene	1110	0.000		c
4	Benzaldehyde	1014	0.000		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.

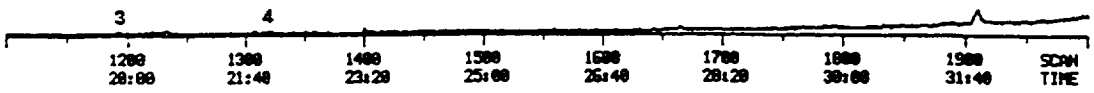
TOTAL DATA: 198711 01 SCANS 200 TO 1100
11/07/94 16:02:00 CALI: 198701CAL 05 OUT OF 200 TO 2000
SAMPLE: P3 SPLITLESS 2MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3



TOTAL DATA: 198711 01 SCANS 1100 TO 2000
11/07/94 16:02:00 CALI: 198701CAL 05 OUT OF 200 TO 2000
SAMPLE: P3 SPLITLESS 2MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3

100.0 314368.

45- 300



	AW-1-STS-58 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	1,2-Dichloro-1,1,2,2-tetrafluoroethane	35008	0.385		b
2	Trichlorofluoromethane	4600	0.062	0.143	a
3	1,1,2-Trichloro-1,2,2-trifluoroethane	4360	0.027	0.051	a
4	Methylene chloride	227328	2.498		b
5	Acetic acid	110720	0.160		c
6	Benzene	5800	0.010	0.019	a
7	Toluene	2060	0.002	0.004	a
8	Xylene or Ethylbenzene	1084	0.002		c
9	Styrene	915	0.001		c
10	Benzaldehyde	1464	0.002		c

a Quantitation based on an actual standard compound.

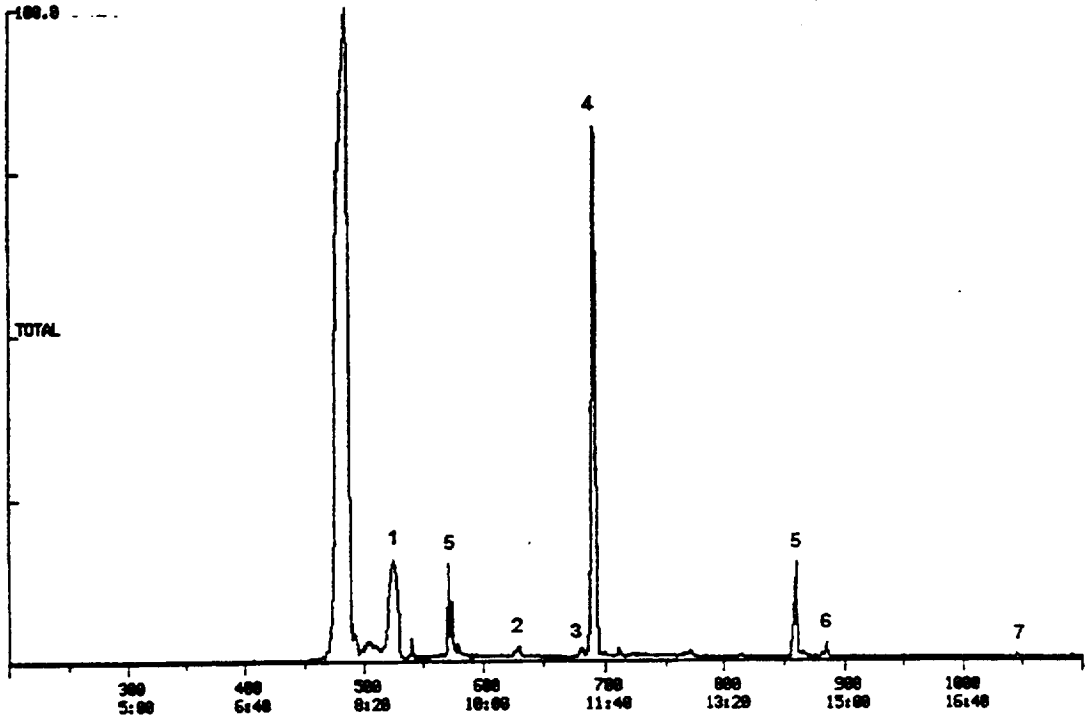
b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.

TOTAL
11/07/94 16:49:00
SAMPLE: AW1 SPLITLESS 2MIN@350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3

DATA: 198712 01
CALI: 198701CAL 05

SCANS 200 TO 1100
OUT OF 200 TO 2000



TOTAL
11/07/94 16:49:00
SAMPLE: AW1 SPLITLESS 2MIN@350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3

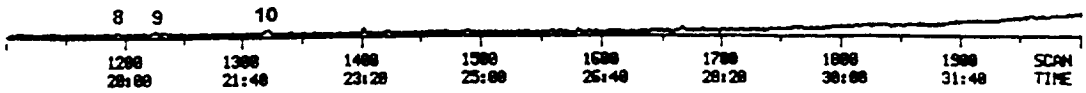
DATA: 198712 01
CALI: 198701CAL 05

SCANS 1100 TO 2000
OUT OF 200 TO 2000

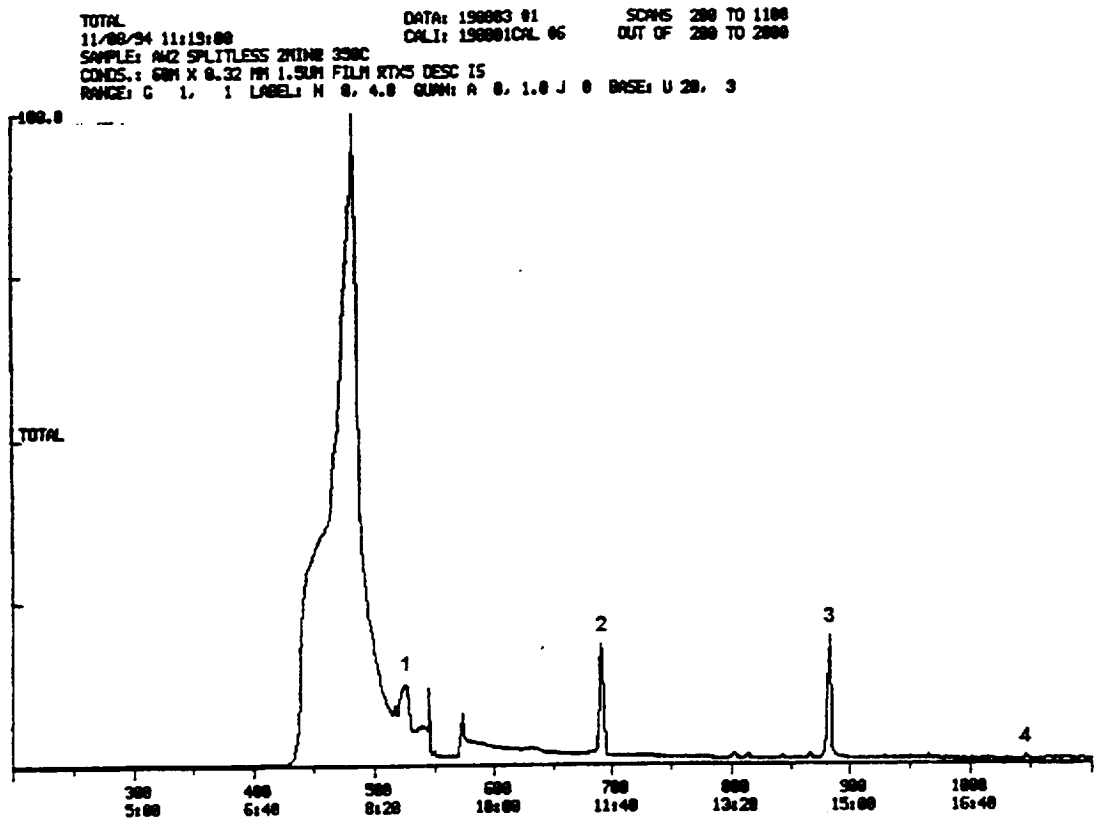
100.0

265728.

45- 300



	AW-2-STS-58 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	1,2-Dichloro-1,1,2,2-tetrafluoroethane	47552	1.128		b
2	Methylene chloride	131840	3.128		b
3	Acetic acid	134144	0.363		c
4	Toluene	4560	0.010	0.021	a
5	Phenol + Benzaldehyde	3584	0.010		c
a Quantitation based on an actual standard compound.					
b Quantitation based on comparison to average of three halogenated standard compounds.					
c Quantitation based on comparison to average of four non-halogenated standard compounds.					

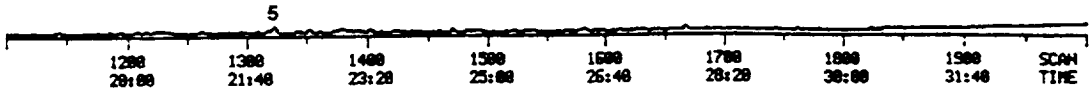


TOTAL
DATA: 190803 01
SCANS 1100 TO 2000
11/08/94 11:19:00
CALI: 190801CAL 06
OUT OF 200 TO 2000
SAMPLE: AW2 SPLITLESS 2MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: C 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3

100.0

783360.

45- 300



	AW-3-STS-58 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	1,2-Dichloro-1,1,2,2-tetrafluoroethane	23136	0.647		b
2	Methylene chloride	161024	4.504		b
3	Chloroform	35456	0.992		b
4	Acetic acid	176640	0.563		c
5	Phenol + Benzaldehyde	3024	0.010		c
6	Limonene	4904	0.016		c

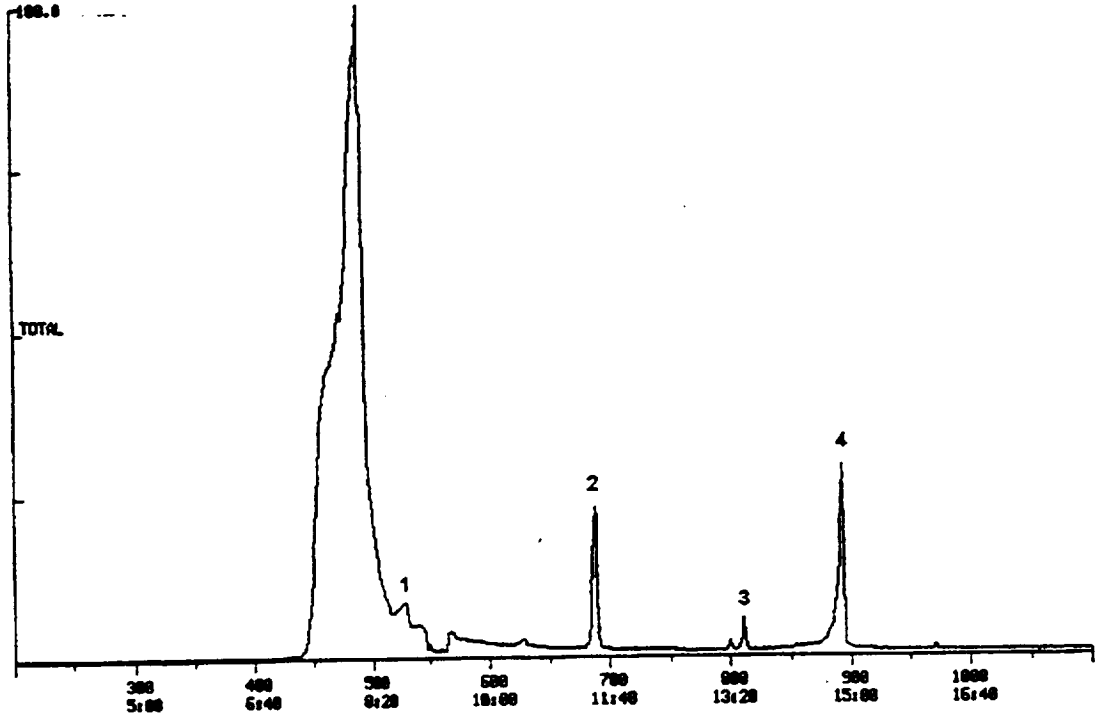
a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds

TOTAL
11/08/94 12:05:08
SAMPLE: A43 SPLITLESS 2MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.8 J 0 BASE: U 20, 3

DATA: 190804 01 SCANS 200 TO 1100
CALI: 190801CAL 06 OUT OF 200 TO 2000

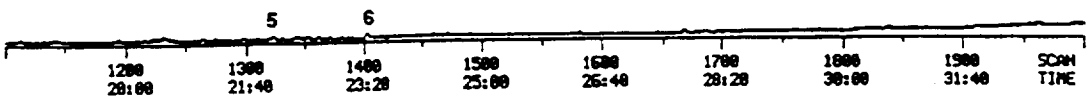


TOTAL
11/08/94 12:05:08
SAMPLE: A43 SPLITLESS 2MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.8 J 0 BASE: U 20, 3

DATA: 190804 01 SCANS 1100 TO 2000
CALI: 190801CAL 06 OUT OF 200 TO 2000

100.0

752640.



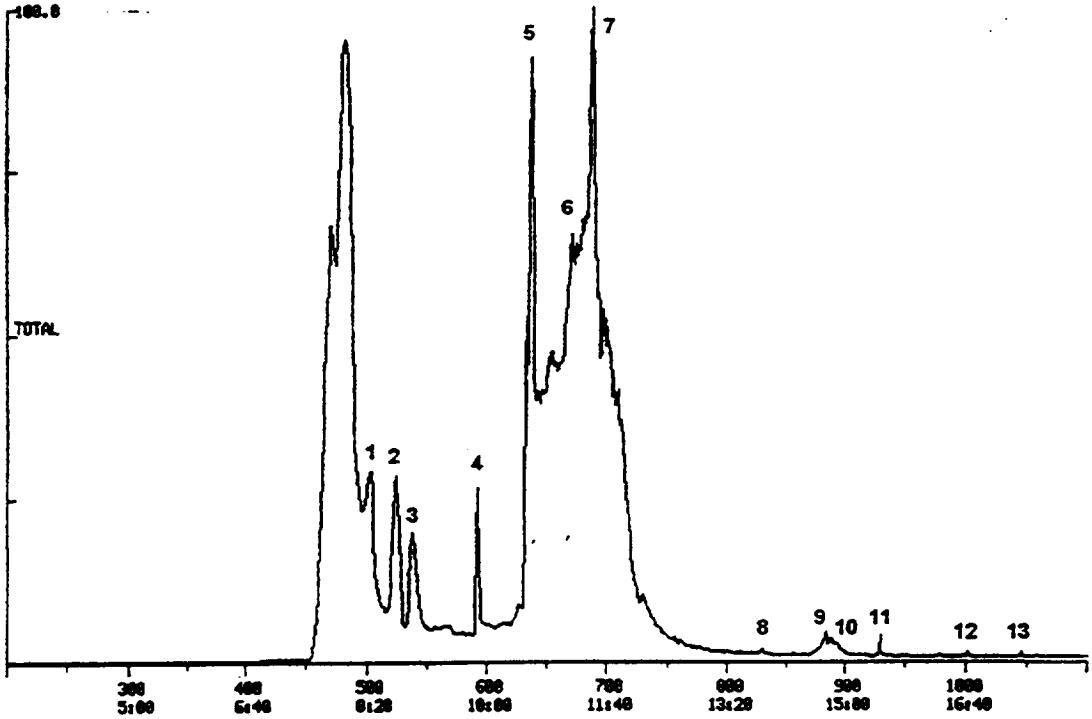
	ACT-1-STS-58 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	1-propene	112384	0.275		c
2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	175872	3.779		b
3	Acetaldehyde	206848	0.507		c
4	Ethanol	265216	2.695	82.151	a
5	Acetone	779844	7.970	64.484	a
6	Isopropanol	865040	55.972	1193.428	a
7	Methylene chloride	314880	6.766		b
8	Tetrahydrofuran	4896	0.012		c
9	Benzene + Cyclohexane	13120	0.033	0.131	a
10	1-Butanol	11328	0.077	0.229	a
11	Acetic acid	18432	0.045		c
12	1-Hydroxy-2-propanone	6480	0.016		c
13	Toluene	6600	0.013	0.041	a

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.

TOTAL
11/08/94 12:46:08
SAMPLE: ACT1 SPLITLESS 2MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. I LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3
DATA: 190805 01
CALI: 190801CAL 06
SCANS 200 TO 1100
OUT OF 200 TO 2000

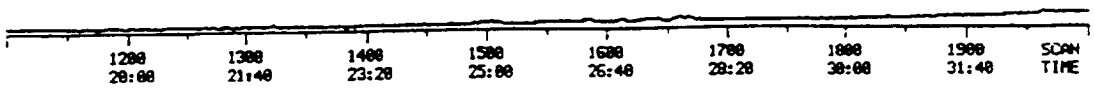


TOTAL
11/08/94 12:46:08
SAMPLE: ACT1 SPLITLESS 2MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. I LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3
DATA: 190805 01
CALI: 190801CAL 06
SCANS 1100 TO 2000
OUT OF 200 TO 2000

100.0

743424.

45- 300

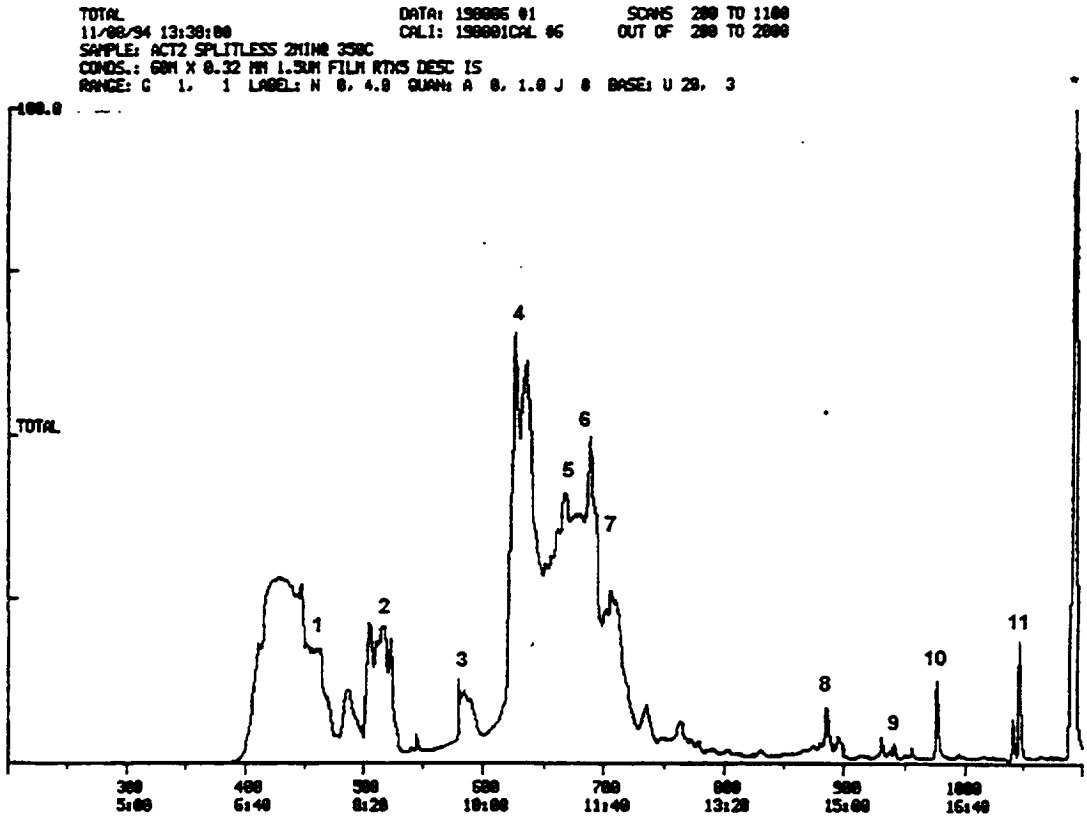


	ACT-2-STS-58 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	1-propene	122496	0.275		c
2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	174592	3.442		b
3	Acetaldehyde	71296	0.160		c
4	Ethanol	127744	1.191	36.300	a
5	Acetone	3496600	32.785	265.248	a
6	Methylene chloride	388608	7.661		b
7	Isopropanol	2332710	138.469	2952.433	a
8	Benzene + Cyclohexane	173056	0.400	1.583	a
9	1-heptene	53824	0.121		c
10	Unknown, silane BP 77, 45(30)	243200	0.547		c
11	Toluene	429568	0.768	2.442	a
12	N,N-Dimethylformamide	31968	0.072		c
13	Tetrachloroethene	31424	0.619		b
14	Xylene or Ethylbenzene	25600	0.058		c
15	Unknown, BP 133, 151(70)	596992	1.342		c
16	O-Xylene	48448	0.109		c
17	Siloxane, BP 281	1470460	3.306		c
18	C3-Benzene	33408	0.075		c
19	Trimethylbenzene	42240	0.095		c
20	2-Ethyl-1-hexanol	279040	0.627		c
21	Siloxane	303616	0.683		c
22	Hydrocarbon	57216	0.129		c
23	Hydrocarbon	32768	0.074		c
24	Siloxane, BP 73, 267(40)	615424	1.384		c
25	Methenamine	52672	0.118		c
26	Caprolactam	57920	0.130		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.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SCANS 200 TO 1100
11/08/94 13:38:00
CALI: 190801CAL 06
OUT OF 200 TO 2000
SAMPLE: ACT2 SPLITLESS 2MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
TOTAL
1
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300
5:00
400
6:40
500
8:20
600
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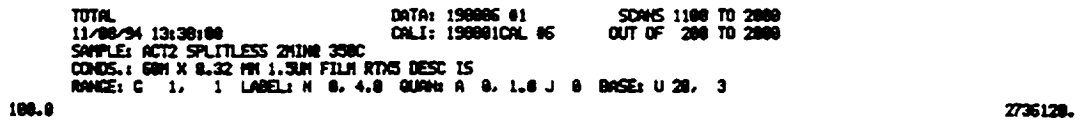
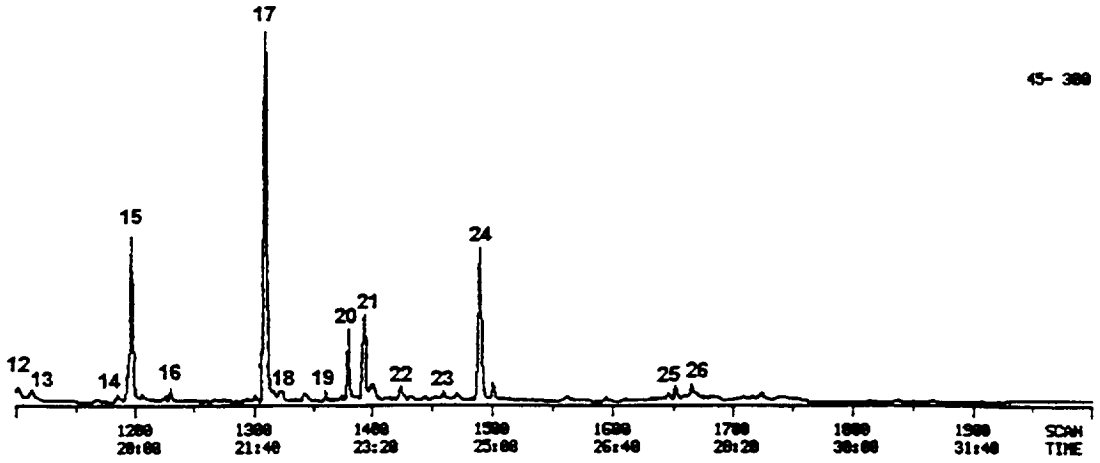
11:40
800
13:20
900
15:00
1000
16:40


TOTAL
DATA: 190806 01
SCANS 1100 TO 2000
11/08/94 13:38:00
CALI: 190801CAL 06
OUT OF 200 TO 2000
SAMPLE: ACT2 SPLITLESS 2MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3
100.0
2736128.


45- 300
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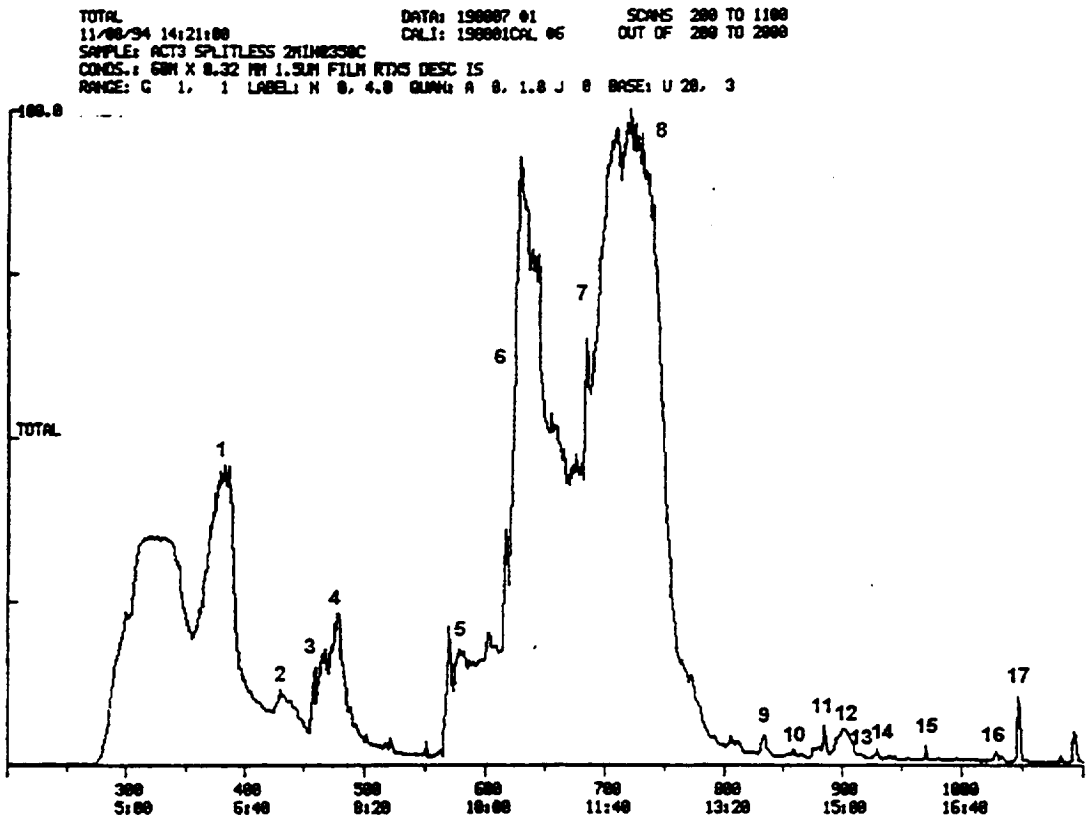
1300
21:40
1400
23:20
1500
25:00
1600
26:40
1700
28:20
1800
30:00
1900
31:40
SCAN
TIME

	ACT-3-STS-58 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	1-Propene	147968	0.479		c
2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	50880	1.443		b
3	Acetaldehyde	173824	0.562		c
4	Propane	281600	0.911		c
5	Ethanol	498688	6.689	203.918	a
6	Acetone	8449090	113.996	922.300	a
7	Methylene chloride	324096	9.194		b
8	Isopropanol	9250290	790.140	16847.335	a
9	Tetrahydrofuran	60928	0.197		c
10	1,1,1-Trichloroethane	22464	1.642	10.426	a
11	Hydrocarbon	22784	0.074		c
12	Benzene + Cyclohexane	84736	0.282	1.116	a
13	1-Butanol	64832	0.579	1.734	a
14	Hydrocarbon	29664	0.096		c
15	Acetic acid	42176	0.136		c
16	1-Hydroxy-2-propanone	13760	0.045		c
17	Toluene	189952	0.489	1.554	a
18	Tetrachloroethene	10656	0.302		b
19	N,N-Dimethylformamide	10608	0.034		c
20	Xylene or Ethylbenzene	6632	0.021		c
21	Xylene or Ethylbenzene	20832	0.067		c
22	Styrene + N,N-dimethylacetamide	8384	0.027		c
23	O-Xylene	6040	0.020		c
24	Phenol + Benzaldehyde	8832	0.029		c
25	2-Ethyl-1-hexanol	15808	0.051		c
26	Hydrocarbon	9792	0.032		c
27	Unknown, BP 69, 81(50)	25152	0.081		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.

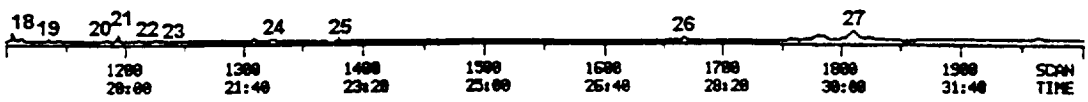


TOTAL
11/08/94 14:21:00
DATA: 190807 01
CALI: 190801CAL 06
SCANS 1100 TO 2000
OUT OF 200 TO 2000
SAMPLE: ACT3 SPLITLESS 2MIN@350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1, 1 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

100.0

2183168.

45- 300

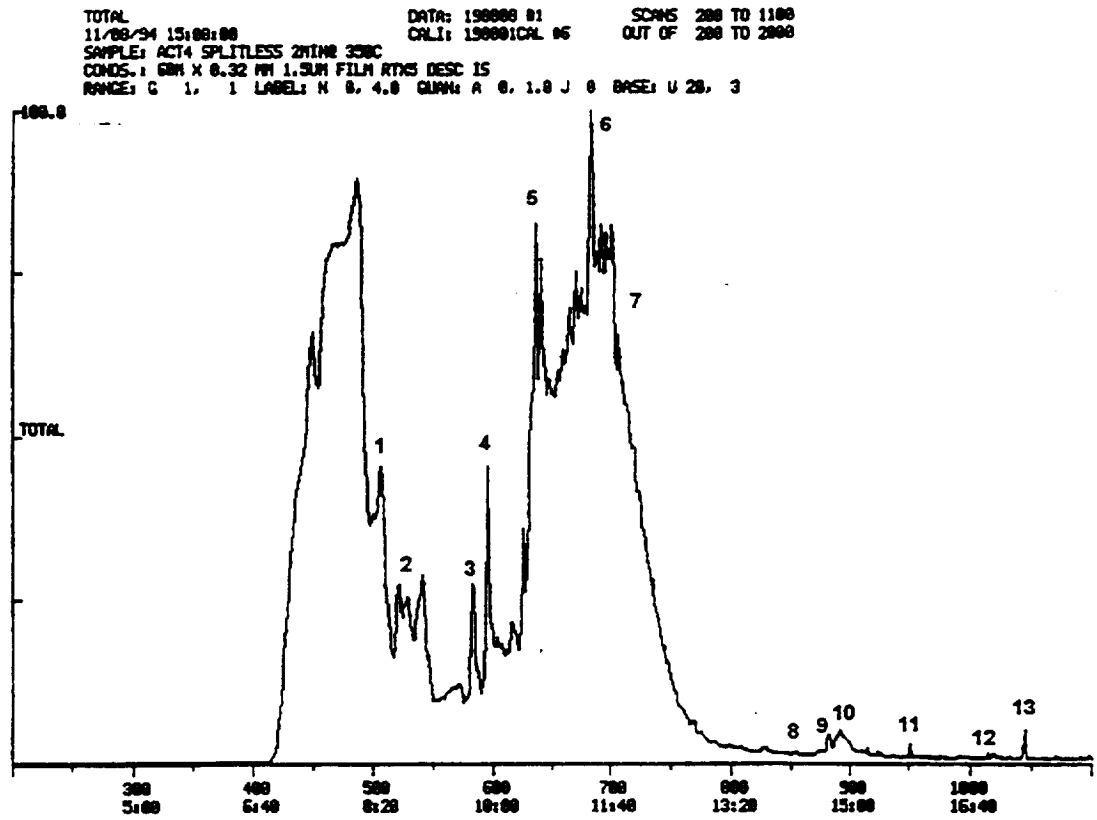


	ACT-4 -STS-58 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	1,1-Dichloro-1,2,2,2-tetrafluoroethane	121728	3.919		b
2	Propane	63616	0.234		c
3	Ethanol	571392	8.697	265.164	a
4	Trichlorofluoromethane	74624	3.277	19.481	a
5	Acetone	1930800	29.565	239.196	a
6	Methylene chloride	272384	8.769		b
7	Isopropanol	1168700	113.294	2415.647	a
8	1,1,1-Trichloroethane	5576	0.463	2.937	a
9	Benzene + Cyclohexane	21984	0.083	0.328	a
10	1-Butanol	29280	0.297	0.889	a
11	Acetic acid	16320	0.060		c
12	1-Hydroxy-2-propanone	6416	0.024		c
13	Toluene	37440	0.109	0.348	a
14	Tetrachloroethene	3968	0.128		b
15	N,N-Dimethylformamide	5112	0.019		c
16	Xylene or Ethylbenzene	3380	0.012		c
17	Hydrocarbon	16384	0.060		c
18	Hydrocarbon	16544	0.061		c
19	Unknown BP 69, 81(55)	21184	0.078		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.

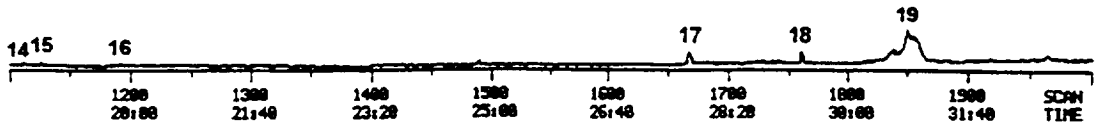


TOTAL
11/08/94 15:08:08
DATA: 190808 01
CALI: 190801CAL #6
SCANS 1100 TO 2000
OUT OF 200 TO 2000
SAMPLE: ACT4 SPLITLESS 2MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3

100.0

982816.

45- 300

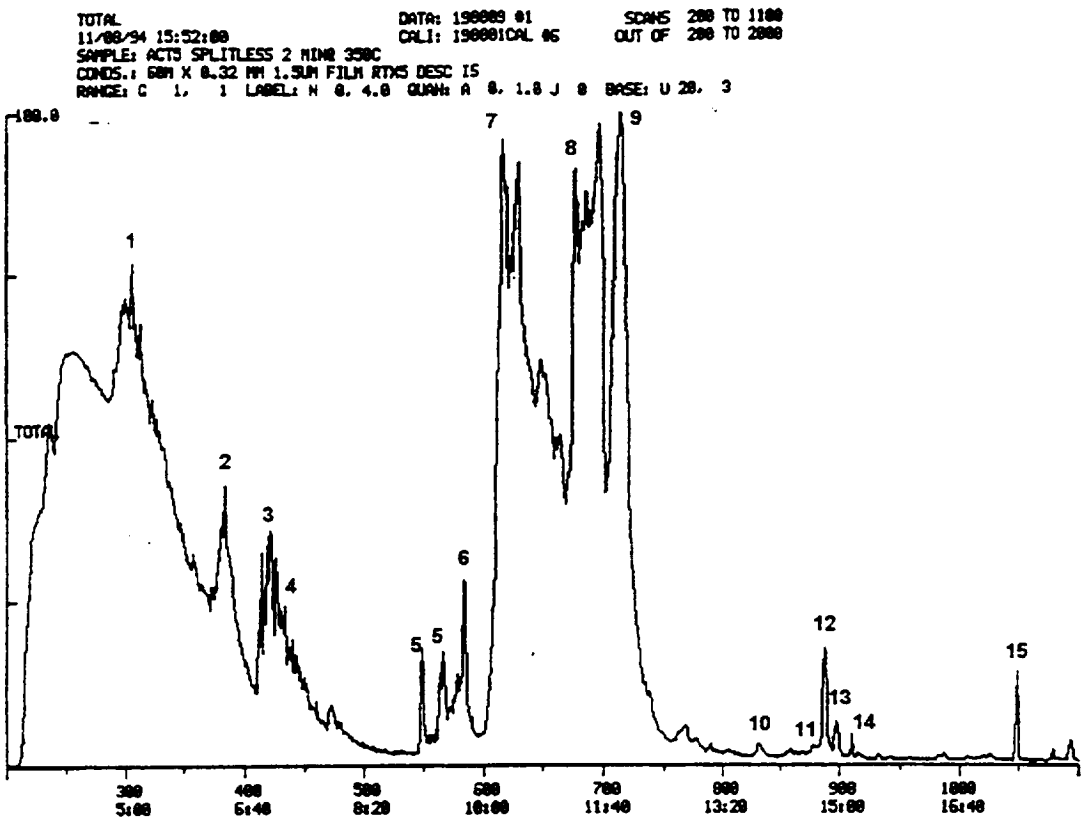


	ACT-5-STS-58 Compounds Identified				
Peak No.	Identification	RIC Value	Conc (µg/g) Meas.	Conc (µg/g) Corr.	
1	1-Propene	101632	0.400		c
2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	142336	4.914		b
3	Acetaldehyde	242176	0.954		c
4	Propane	167424	0.659		c
5	Ethanol	410624	6.702	204.339	a
6	Trichlorofluoromethane	416768	19.624	116.670	a
7	Acetone	4300910	70.619	571.351	a
8	Methylene chloride	293888	10.146		b
9	Isopropyl alcohol	1033260	107.409	2290.161	a
10	Tetrahydrofuran	19168	0.075		c
11	Formic acid	10384	0.041		c
12	Benzene + Cyclohexane	183040	0.741	2.933	a
13	1-Butanol	76032	0.826	2.474	a
14	Acetic acid	38592	0.152		c
15	Toluene	138752	0.435	1.382	a
16	N,N-dimethylformamide	8736	0.034		c
17	4-Methylpentanenitrile	5032	0.020		c
18	Xylene or Ethylbenzene	5384	0.021		c
19	Phenol	5280	0.021		c
20	3-Methyl-2(5H)-furanone	4536	0.018		c
21	Nonanal	3776	0.015		c
22	Decanal	4568	0.018		c
23	Methenamine	8864	0.035		c

a Quantitation based on an actual standard compound.

b Quantitation based on comparison to average of three halogenated standard compounds.

c Quantitation based on comparison to average of four non-halogenated standard compounds.



TOTAL
11/08/94 15:52:00
SAMPLE: ACT3 SPLITLESS 2 MIN@ 350C
CONDS.: 60M X 0.32 MM 1.5UM FILM RTX5 DESC IS
RANGE: G 1. 1 LABEL: N 0. 4.0 QUAN: A 0. 1.0 J 0 BASE: U 20. 3
DATA: 190009 01
CALI: 190001CAL 06
SCANS 1100 TO 2000
OUT OF 200 TO 2000

100.0

1177590.